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UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Marketing Service
Grain and Seed Division

HAY INSPECTORS MANUAL

INTERPRETATION AND APPLICATION
OF THE U. S. STANDARDS FOR HAY AND STRAW
AND THE RULES AND REGULATION GOVERNING
INSPECTION OF HAY AND STRAW



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Foreword

This manual has been prepared primarily for the purpose of providing Federal hay inspectors with information incidental to the interpretation and application of the official U. S. standards for hay and straw and the rules and regulations governing the inspection of hay and straw. A secondary purpose is to provide Federal hay supervisors and agricultural college agronomists with a text on hay inspection problems that will prove useful in teaching this subject to inspectors and college students. Much space has been devoted in this manual to the discussion of those unusual and therefore difficult problems in hay inspection which supervisors and inspectors at shipping points and central markets have brought to the attention of the Grain and Seed Division. Stress has been laid on the exceptional problems because the every day, common problems of inspection are plainly covered in the official standards and need but slight discussion. The inspector or student who uses this manual will find considerable repetition and cross-referencing in its many subjects and paragraphs. The authors have purposely written repetitions into numerous paragraphs in order to give the reader as complete a picture as possible of each problem. Many problems are closely interlocked with other problems but it is believed that the use of some repetition and cross-referencing will assist the reader in arriving at a complete and definite solution of the subject in which he is especially interested when he refers to the manual for guidance.

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HAY INSPECTORS' MANUAL

SECTION I - GENERAL INFORMATION

CHAPTER 1 - INSPECTORS' RESPONSIBILITIES

1 MANUAL INSTRUCTIONS SUPPLEMENT STANDARDS AND RULES AND REGULATIONS:- Efficiency in inspection requires that inspectors keep thoroughly informed on every detail of the United States standards for hay and straw and the rules and regulations governing inspection. The instructions and explanatory matter in this manual with reference to hay and straw standards and the rules and regulations governing inspection are intended to explain certain inspection problems and procedures that are not covered fully in the Handbook of Official Hay Standards and the Rules and Regulations. Inspectors must use the definitions and specifications in the Handbook and the Rules and Regulations as the basis for answering all questions pertaining to the application of the standards and inspection procedure.

2 RETENTION OF LICENSE DEPENDS UPON EFFICIENCY:- Although licensed Federal hay inspectors may not be employees of the United States, they are responsible to the U. S. Department of Agriculture for the conduct of the hay inspection work. The retention of a license by an inspector is dependent upon the manner in which he performs his work. This includes such matters as the application of the standards and the rules and regulations, the preparation of track notes and inspection certificates, the submission of hay supervision samples, the handling of correspondence, and the compliance with instructions from his supervisor and the Washington office.

3 WHEN IN DOUBT CONCERNING AUTHORITY, CONSULT SUPERVISOR:- When an inspector is in doubt concerning his authority in connection with inspection matters, he should write or if necessary wire his supervisor for instructions. Inspection problems may arise which, in the inspector's opinion, cannot be handled strictly in accordance with published regulations. Under such circumstances the advice of the division supervisor should be obtained at once. If time does not permit the inspector to do this, he should use his own judgment in the matter and immediately report to his division supervisor the action taken.

4 INSPECTORS SHOULD CARRY OUT POLICIES OF THE SERVICE:- When a policy has been definitely established inspectors are required to carry it out even though it may not be entirely in accord with their personal views. The standards and regulations should be applied always according to the interpretation of the Agricultural Marketing Service. This does not, however, preclude the offering of constructive suggestions by inspectors for the improvement of the service.

CHAPTER 2 - PRODUCTS WHICH MAY BE CERTIFICATED

5 Federal hay inspectors are authorized to investigate and certify the class, quality, and/or condition of hay and straw under the regulations of the Secretary of Agriculture. The definition for hay in these regulations has been written so as to include products which are similar to hay but which are not considered as hay under the Official Hay Standards or which do not conform to the dictionary definition for hay. (Section 57.2 (f) of the Regulations.) The products which a Federal hay inspector may certificate are not limited, therefore, merely to those hays and straws included in the U. S. standards. Authority is given to issue Federal hay certificates for all these products hereinafter enumerated in this paragraph namely: (1) Hays and straws for which U. S. standards have been promulgated, which must be certified by U. S. classes and grades; (2) Hays and straws for which no U. S. standards have been promulgated, which may be certificated by other grades of recognized standing, or by descriptive statements of facts (HIM 183 to 189); and (3) Certain forage products, such as threshed timothy, corn stover, corn fodder, and other similar roughages, whether whole, chopped, or shredded. These products are closely related to true hay and straw and may, therefore, be certificated by descriptive statements of facts (HIM 190 and 191).

6 HAY DEFINED FOR PURPOSES OF U. S. STANDARDS:- The official standards promulgated by the Secretary of Agriculture and revised April 1, 1936, provide class and grade specifications for the most important kinds and mixtures of various kinds of hay that enter commerce. A specific definition for hay is given on Page 5 of the Handbook of Official Hay Standards which is applicable to all groups. The product hay, therefore, in the standards is a definitely prescribed and limited product.

Hay, to be certificated under U. S. standards must (1) be a kind or mixture of hay included in the standards, (2) be unthreshed herbage, (3) have recognized feeding value, (4) contain not over 35% foreign material, and (5) not be both coarse and woody.

In the two items next succeeding reference is made to kinds of hay, to straw and to hay-like products which may be certificated but which do not meet the requirements for hay in the standards.

7 HAY NOT CLASSIFIED IN U. S. STANDARDS:- There are many kinds of plants which, when harvested, are recognized as hay in commerce but which are not classified in the U. S. standards. Some of the most important kinds that are offered for inspection are CANE HAY, AND CHOPPED ALFALFA.

KINDS OF HAY also which are classified in the standards but WHICH CONTAIN MORE THAN 35% FOREIGN MATERIAL comprise another list of products which are hay in common language but which are not hay for the purposes of the standards. Clover hay, for example, which contains more than 35% of foreign material is excluded from the standards because it is not considered good policy to lend the force and effect of any U. S. grade to a hay product which consists so largely of waste material.

The specification "must have recognized feed value as determined by the Agricultural Marketing Service, United States Department of Agriculture" excludes certain KINDS OF HAY from the standards. An example may be had in GRASSES, SEDGES, and RUSHES THAT ARE COMMONLY HARVESTED FOR PACKING PURPOSES, RUG MAKING AND BEDDING,

such as the harsh, stringy, so-called wire grasses of Minnesota and Wisconsin often used for rug making and packing purposes. Products of this character are hay in the common language of the trade even though unclassified in U. S. standards.

Such products as CHOPPED ALFALFA are commonly considered as hay even though they are not classified in U. S. standards. Chopped hays of any kind, when in an unmixed condition, may be certificated as hay by Federal hay inspectors.

Methods for certificating hay not classified in the U. S. standards are given in HIM 183 to 189.

8 STRAW AND PRODUCTS SIMILAR TO HAY:- The official standards for straw promulgated by the Secretary of Agriculture, provide specifications for the most important kinds of straw. There are no specifications, however, for a number of other products that are closely akin to hay or straw both in character and in merchandising, SUCH AS THRESHED TIMOTHY, THRESHED ALFALFA, THRESHED REDTOP, FLAX STRAW, BEAN STRAW, OR COARSE AND WOODY SWEET CLOVER. Nevertheless Federal hay inspectors are authorized to certificate such products in Federal hay certificates because they are so closely allied to hay. (Section 57.2(f) of the Regulations.)

THRESHED TIMOTHY, ALFALFA, REDTOP, GRAINS, or other threshed forage crops, are not considered as hay under the official hay standards because the Food, Drug, and Cosmetic Act classifies such products as straw, and the certification thereof as hay would be misrepresentation under the Act.

Forage plants that have been allowed to remain uncut until they have become so COARSE AND WOODY that they have little feed value are not considered as hay for inspection purposes. This matured condition is sometimes found in such plants as sweet clover and rank midland grasses. In the standards the term "which is not coarse and woody" in the definition for "hay" must be construed in a different manner from the special grades for "coarse hay". In the definitions the words, "coarse and woody" must be considered together and in conjunction with the term "which has recognized feeding value" so as to define a type of herbage that is so "coarse" as well as so "woody" as to have no recognized feed value. The special grade "coarse", on the other hand, applies to hay that, while coarse has some recognized feed value.

Methods for certificating straw and other products that are closely akin to hay are given in HIM 190 and 191.

9 PRODUCTS WHICH SHALL NOT BE CERTIFICATED:- Any forage product such as a MIXED FEED, consisting partly of hay or straw and partly of molasses, grain or other product, shall not be certificated as to its class, quality, or condition, by any method in a Federal hay certificate. Any forage product, such as alfalfa which has been ground fine into meal shall not be certificated, by any method, in a Federal hay certificate. The authority of the inspector is limited to the inspection of hay and straw as outlined in item 5 of this manual.

CHAPTER 3 - RELATIONS WITH OTHER GOVERNMENT DEPARTMENTS

10 GOVERNMENT DEPARTMENTS REQUIRED TO PURCHASE HAY BASIS UNITED STATES STANDARDS:- The United States standards for hay and straw have been adopted by the Federal Specifications' Board as master specifications, therefore, contracts to furnish hay and straw to Government Departments are let on the basis of these standards. As a result of this arrangement, Government Departments, as well as persons having contracts to furnish Government Departments with hay or straw, often desire the assistance of a Federal hay inspector in determining the grade of hay or straw submitted or to be submitted under contract.

11 ARRANGEMENT WITH WAR DEPARTMENT:- Under an agreement between this Department and the War Department, officers of the Army Veterinary Corps have been trained and licensed as Federal hay inspectors. Certain employees of the Grain and Seed Division have been designated to maintain contact between the Department of Agriculture and the licensed officers of the Veterinary Corps. Employees so designated have been given specific instructions regarding the manner in which such contacts shall be handled.

CHAPTER 4 - MATTERS NEEDING INVESTIGATION

12 The inspector should report to his division supervisor for investigation any matters coming to his attention which consist of violations of the Rules and Regulations by any trade organization or individual or of unethical trade practices, that jeopardize the Federal hay inspection service and its usefulness to the hay industry. Such matters should include the misuse of inspection certificates; attempts to substitute other hay for that on which inspection has been made; the loading of low-grade hay in the ends of cars so it will be concealed; violations of the Food, Drug, and Cosmetic Act, evidenced by the presence of sticks, stones, dirt, or other foreign substances which the inspector believes did not occur naturally but were baled with the hay to perpetrate a fraud; and such other matters that have a bearing on the conduct and operation of the hay inspection service.

SECTION II - INSPECTION

CHAPTER 5 - APPLICATIONS FOR INSPECTION

13 APPLICATIONS ACCEPTED ONLY FROM FINANCIALLY INTERESTED PARTIES:- Inspections are made only upon receipt of an application from a person financially interested in the hay, or his agent (Section 57.6 of the Regulations).

14 FILING APPLICATIONS:- The regulations provide that interested parties may file an application in writing, orally, by telegraph, or by telephone. If filed orally or by telegraph, the inspector receiving the application may require that it be confirmed in writing (Section 57.7 of the Regulations). Inspectors should require that blanket applications for inspections be made in writing except for hay inspected for members of exchanges or other organizations with which the Service has an agreement specifying that all of their receipts must be inspected. If this is not done, questions may arise later as to the date of expiration of the application or the items covered by it. Written applications for a single inspection need only be required when the inspector believes the applicant might raise a question about having asked for the inspection when a statement of fees and charges is presented. In such cases the best course is to demand payment of the fees and charges in advance.

An application for inspection should contain the information required in Section 57.8 of the Regulations. This information should be clearly stated so that the inspector may determine whether he has authority to make the inspection. All written applications must be filed in the inspector's office.

15 APPLICATIONS FOR INSPECTION AWAY FROM OFFICIAL STATION:- Inspectors will be expected to use their discretion about making inspections at points other than their regular station. They should render service at these outside points whenever it can be done without impairing the inspection facilities at their regular station. The expression "at nearby points accessible to such inspectors" (Section 57.4 of the Regulations) may be interpreted to include any point which the inspector can reach in the time he can spare from his regular work. It is understood that this may vary at different seasons and under different conditions. In this, as in all other cases, the inspector should be sure that the applicant is willing to pay the cost of the service before doing the work or incurring any expense in connection therewith.

16 INFORMATION IN APPLICATION:- Applications for inspection should be in sufficient detail to supply the inspector with the necessary information to determine whether or not the inspection can be made. Applicants for inspection, except at points where inspections are made under blanket orders, should furnish the inspector the following information (a to g inclusive) relative to the lot or lots of hay included in the application (Section 57.8 of the Regulations).

(a) KIND OF INSPECTION DESIRED. The application should state whether a partial, complete, bale, sample, or appeal inspection is desired. If the applicant requests a partial inspection and the inspector finds that he can make a complete inspection under the regulations, this should be done as provided for in Section 57.5 (b) of the Regulations. However, if the fee for complete inspection is greater than that for partial inspection, the inspector should communicate with the applicant

and offer him the opportunity of changing the application. If the applicant is unwilling under these circumstances to have a complete inspection made, the application may be refused.

(b) QUANTITY: The quantity should be the total quantity of hay in the lot and not the quantity visible for inspection. For example, this may be approximately 500 tons, a carlot, a truck and trailer lot, one bale, or if less than a bale the approximate number of pounds. Loose hay should be stated as approximate number of tons or pounds.

(c) IDENTIFICATION. The applicant should furnish sufficient information to fully identify the hay. When the hay is in cars, the car initials and number are sufficient. The complete initials should be given in every case. On some cars the initials on the sides are not the same as those on the ends. The initials on the ends should be used. The car number should always be taken from the outside of the car. Sometimes cars that have been repainted show different numbers on the inside walls than on the outside of the car.

Hay in a warehouse is usually identified by the name of warehouse and section name or number. This information usually may be shown under location and the space for identification left blank, but if for any reason, such as the warehouse not being divided into sections or such as several lots being stored in one section, additional information is necessary, it should be furnished. This might be a description of tags on the hay or a statement that the hay has been stored in the names of certain persons.

Hay unloaded directly into public warehouses from cars is identified by the car initials and number if these can be definitely established from the records of the warehouse. In all such cases, the statement under location must definitely establish the fact that the hay was in the warehouse when inspected.

(d) LOCATION. The location should show as clearly as is consistent with local conditions the exact location of the hay. If in a car, this should be the railroad yard and, if possible, the track on which the car is set; if in a warehouse its name, and if possible, the name and number of the section in which the hay is stored; if on a farm or elsewhere, as complete a description of the location as possible. The application should also show the town and state in which the hay is located.

(e) APPLICANT. The name, address, and interest of the applicant must be given. If considered necessary in the judgment of the inspector, he may require proof of the applicant's interest. In such event, a statement by the inspector of the proof given and, if possible, any papers offered in evidence or copies of them should be attached to the application and filed in the inspector's office.

(f) INTERESTED PARTY. The question may sometimes arise as to whether the applicant actually is an interested party and thereby entitled to the benefits of the Act on the lot in question. Any one who has a financial interest in the shipment should be considered an interested party (Section 57.6 of the Regulations).

(g) AGENTS. When the application is signed by a person representing himself as agent of the applicant, the inspector may require proof of his authority.

In the case of a person or concern of high repute that is known generally to the trade as a broker or commission man for the applicant, this is unnecessary; but otherwise it will be well to obtain the necessary proof. In the case of a firm specified to be representing the shipper whenever inspections are desired, the agent should furnish a letter from the shipper designating him as the shipper's agent and stating that he is to act as agent until the authority contained in the letter is revoked by the shipper. In individual applications a letter or telegram from the applicant to the person signing the application, instructing the latter to secure the inspection, should be sufficient proof of authority. Such letters or telegrams or copies of them should be filed with the application in the inspector's office.

CHAPTER 6 - CONDITIONS GOVERNING ACCEPTANCE OR REFUSAL OF APPLICATION

17 WHEN AN INSPECTION MAY BE MADE:- An inspector's first consideration when an application is received, and before any expenses are incurred in making the inspection should be whether he has authority to inspect the lot or lots of hay included in the application. Points to be considered in this connection are:

(a) Is the hay located so as to be accessible for the kind of inspection requested (Section 57.13 of the Regulations)?

(b) If a partial inspection is requested, can it be made (Section 57.5(b) of the Regulations)?

(c) If a sample inspection, is the sample of sufficient size (Section 57.5(c) of the Regulations)?

(d) Is the applicant an interested party or the agent of an interested party (Sections 57.6 and 57.12 of the Regulations)?

18 WHEN AN INSPECTION MAY BE REFUSED:- An application for an inspection may be refused by a hay inspector if it does not comply with the act or any regulation (Section 57.10 of the Regulations). This includes applications for inspection at points other than the inspector's regular station which he cannot reach either on account of distance, inability to leave his regular work, or for any other reason; also applications for inspections of samples too small to permit correct determination of their class and grade, (Section 57.5(c) of the Regulations) and refusal of the applicant or owner of the hay to permit bales to be opened when requested by the inspector (Section 57.13 of the Regulations).

19 HANDLING INSPECTION AT POINTS OTHER THAN THE INSPECTOR'S OFFICIAL STATION:- There may be times when an inspector is unable to comply with a request for inspection at some point other than his official station, but believes some other inspector might do so. In such cases, he should telegraph either his division supervisor or the other inspector, giving a full statement of the case, and advise the applicant of the action taken. In such cases the second inspector or division supervisor will notify the first inspector whether the inspection can be made, and the first inspector should then either finally refuse the inspection or mail the application to the inspector who will make the inspection, notifying the applicant accordingly.

20 **APPLICANT SHOULD BE ADVISED WHEN APPLICATION IS REFUSED:-** When an application for an inspection is refused (Section 57.10 of the Regulations), the inspector should send a notice of the refusal to the applicant, together with all the documents filed with the application. A copy of this notice should be filed with the application in the inspector's office and a copy sent to the division supervisor. When the application is an oral one, the inspector should prepare a memorandum application.

21 **HAY SHOULD BE EXAMINED UNDER PROPER CONDITIONS:-** Efficient inspection demands that the inspector examine the hay very carefully according to the methods of procedure prescribed in this manual, otherwise some factor may be overlooked which will materially affect the grade and class. No attempt should be made to inspect hay where the light is poor, where the applicant refuses to permit the opening of bales (Section 57.13 of the Regulations), or under conditions where it is impossible to make a close and thorough examination of the hay.

22 **HAY MUST BE ACCESSIBLE FOR INSPECTION:-** The applicant for an inspection will cause the hay for which inspection is requested to be made accessible for examination and to be placed so as to disclose the correct class, quality, and condition. If the applicant is not willing to do this, the inspector may refuse to make the inspection (Section 57.13 of the Regulations).

23 **ENOUGH HAY SHOULD BE AVAILABLE TO PERMIT INSPECTORS TO CORRECTLY DETERMINE GRADE:-** When an inspector is called upon to inspect a lot of hay in a railway car, warehouse, on a truck, etc., enough of the hay should be available to satisfy the inspector that he is able to see a sufficient portion of the hay to correctly determine the class, quality, and condition of the part certificated.

CHAPTER 7 - COMPLETE INSPECTION

24 **COMPLETE INSPECTIONS ARE OF TWO KINDS:-** (1) Where the inspector examines all of the lot or a sufficiently representative portion of the lot to permit him to determine the quality of the entire lot (Section 57.5(a) and (b) of the Regulations), (2) where the inspector examines and places a grade on each bale in the lot (Section 57.5(a) of the Regulations).

25 **THERE IS NO FIXED RULE AS TO THE QUANTITY OF HAY AN INSPECTOR SHOULD SEE WHEN MAKING AN ORDINARY COMPLETE INSPECTION:-** This will depend upon the character of the hay and the conditions under which the inspection is made. At country shipping points where farm storage facilities for hay are inadequate, or where stack spot is prevalent, or when large quantities of unsound and otherwise low-grade hay have been produced as the result of unfavorable haymaking weather, it is often necessary for the inspector to examine every bale in the lot at the time of loading for shipment. It is even necessary under certain conditions for an inspector to see all four sides of each bale in the lot when making the inspection. On the other hand, under conditions at shipping points where weather conditions have been favorable for making hay so that unsound hay is uncommon, or at terminal markets where cars are carefully plugged (HIM 28), the inspector may be justified in issuing a complete inspection certificate when he sees only one-third to one-half of the bales in the lot.

26 INSPECTOR RESPONSIBLE FOR GRADE OF ENTIRE LOT WHEN MAKING COMPLETE INSPECTION:- When making a complete inspection, the inspector is responsible for assigning a grade or the grades that are representative of the entire lot. Therefore, it is left largely to his judgment to determine the quantity of hay that should be examined before issuing a complete inspection certificate (Section 57.5(a) of the Regulations). It is not difficult to determine the quality and condition of a uniform lot of sound hay. On the other hand, lots of hay composed of mixed grades and classes or otherwise differing from the ordinary run of hay are often difficult to inspect. Hay that is sweated, musty, or moldy, may show little or no evidence of this condition from the exterior portions of the bale (HIM 98, 108, 109 and 128). If there is any question about the quality and condition of a lot of hay, one or more average bales in the lot should be opened or the cores of several bales examined through the use of a sampling rod. When an applicant requests a complete inspection and the inspector finds that, because of poor light or the arrangement of the bales in the lot, only a partial inspection can be made, he should notify the applicant so that he may, if possible, make the hay available for complete inspection.

27 COMPLETE BALE INSPECTION:- The procedure for making complete bale inspections is the same as that for ordinary complete inspections except that when making a complete bale inspection the inspector should carefully examine and place a grade on each bale in the lot (Section 57.5(a) of the Regulations). The back of the inspector's note sheet should be used to tally each bale so that the certificate issued will show the exact number of bales of each grade and class in the lot.

28 PLUGGING FOR COMPLETE INSPECTION:- There is no fixed rule for plugging carlots, trucklots, or other lots of hay, for complete inspection. The hay visible in any lot on which a complete inspection is to be made should be representative of the entire lot. If the visible portion is not representative of the entire lot or if the inspector suspects that it is not representative, the applicant should be requested to make additional hay available. When plugging carlots of hay for complete inspection, at least two tiers of bales should be removed to within one tier of the floor and one tier of each end of the car. These tiers may be removed from either side of the car or through the center, depending upon the judgment of the inspector. No fixed method of plugging lots of hay for complete inspection should be followed, especially at shipping points, because under such conditions loaders might conceal off-grade bales in the lot so as to deceive the inspector.

29 ADVISABLE TO EXAMINE HAY NOT EXPOSED BY PLUG:- It is possible for an experienced plugger or loader to conceal many damaged or otherwise low-grade bales in a lot of hay by turning the damaged portions of the bales to the inside or by throwing them to the rear of the car and pulling hay of good quality toward the doorways. Low-grade hay concealed in this manner is likely to be overlooked unless the inspector makes a careful examination of the hay in the ends of the car and pulls down bales from behind the visible tiers in order to carefully examine some of the hay not visible in the original plug. If there is any indication that the hay exposed is not representative of the entire lot, the applicant should be required to have the car plugged in such a manner that practically every bale in the lot is visible, before the issuance of a complete inspection certificate.

CHAPTER 8 - PARTIAL INSPECTIONS

30 WHEN A PARTIAL INSPECTION SHOULD BE MADE:- A partial inspection is made when not enough of the hay in the lot can be seen to permit the inspector to make a complete inspection. Partial inspections should not be made when an inspector can examine properly enough of the lot to make a complete inspection (Section 57.5(b) of the Regulations). Some of the conditions under which partial inspections should be made are the following:

- (a) Where the hay visible is only that located in one or two doorways of a car.
- (b) Where the hay visible is only that in a small plug removed from a car.
- (c) Where the hay visible is only that on the ends, sides, and top of a pile of a lot of hay piled in a warehouse or in the open.
- (d) Where the lot is loose hay in a stack or mow.

31 INSPECTORS NOT RESPONSIBLE FOR THE GRADE OF HAY NOT VISIBLE WHEN MAKING PARTIAL INSPECTIONS:- In making a partial inspection, the inspector is responsible for only the grade assigned to the visible portion of the lot. Inspectors must not assume any responsibility for the quality and condition of hay that is not visible. The term "visible" for the purpose of the United States standards means that portion of a lot of hay on which all the class and grade factors may be determined. Hay, for example, may be visible to the eye yet cannot be properly inspected due to insufficient light or due to its inaccessibility for handling.

CHAPTER 9 - SAMPLE INSPECTIONS

32 VALUE OF SAMPLE INSPECTION:- Sample inspections are inspections of samples of hay taken from large lots. They usually consist of single bales, portions of bales or portions of loose hay from mow or stack selected as representative of a lot of hay (Section 57.5(c) of the Regulations). Such inspection provides a means of obtaining information about the grade of a lot of hay which is located usually too far from the inspector's office to justify the expense of having an inspector make a personal examination of the entire lot. The value of the sample inspection certificate depends largely on whether the sample is truly representative of the lot from which it was taken.

33 WHEN FEES SHOULD BE CHARGED FOR SAMPLE INSPECTIONS:- Inspectors should not furnish for trading purposes information on samples of hay unless a sample inspection certificate is issued. Wherever hay contractors, dealers, or growers offering hay for sale desire information with reference to the grade of a sample of hay, the inspector or supervisor should issue a sample inspection certificate covering the sample submitted and charge an inspection fee. Should the sample be furnished by a Government agency, a certificate also should be issued as outlined in HIM 52, and no charge should be made for the inspection. Occasionally samples will be inspected that have been submitted by farmers, agricultural college officials, and others, who have no knowledge of the standards or who desire grade information for research or educational

and not for merchandising purposes. Under such conditions no inspection certificate should be issued nor inspection fee charged.

34 SAMPLE INSPECTION CERTIFICATES APPLY ONLY TO THE SAMPLE:- On all sample inspection certificates the statement appears "the grade assigned in this certificate applies only to the sample described". Thus, while sample inspections have some value as general information about the class and grade of the large lot from which they were taken, inspectors should advise applicants for such inspection that the certificates issued thereunder do not provide prima facie evidence of the class and grade of the entire lot of hay from which the sample was obtained. Nevertheless, the sample inspection may be made commercially useful in the determination of disputes, or to evidence sale or purchase specifications, in cases where the interested parties arrange to select an "agreed representative sample" to establish for the purpose of a specific transaction the inspector's grade on the sample as the grade of the commercial lot.

35 WHEN AGREED SAMPLE INSPECTION SHOULD BE MADE:- Under certain conditions appeal inspections cannot be made except at considerable expense to either the applicant or to this service, and appeal inspections are, therefore, impractical. Under such conditions the inspector can sometimes assist interested parties in the settlement of a dispute by suggesting that "agreed representative samples" be selected and forwarded to the nearest supervisor for grading.

36 AGREED SAMPLES SHOULD BE RELATIVELY LARGE AND REPRESENTATIVE OF LOT:- Where interested parties desire sample inspection service of this character either to settle a dispute or to provide general grade information about commercial lots of hay, inspectors should suggest (1) the use of relatively large samples ($\frac{1}{8}$ to $\frac{1}{2}$ bale in size) that may be forwarded by express, (2) that the samples be agreed to as being representative of the kinds and types in commercial lot by the parties interested, or their agents, or by several disinterested parties, and (3) that the form described on page 56 of the Handbook of Official Standards be used in transmitting samples.

CHAPTER 10 - APPEAL INSPECTIONS

37 APPEALS FOLLOW ONLY COMPLETE OR SAMPLE INSPECTIONS:- Appeal inspections are made to determine the accuracy of the complete inspection from which the appeal was taken. Appeal inspections can follow only complete or sample inspections (Section 57.20 of the Regulations). Either all hay in the lot must be examined by the Inspector when making an appeal inspection or a large portion of the lot which the inspector considers fully representative of the entire lot. Appeal inspections must be made (1) before the hay leaves the place where the complete inspection was made from which the appeal was taken, (2) before the condition of the hay has undergone a material change, and (3) before the identity of the hay has been lost. If the hay has left the inspection point where the complete inspection was made, a new complete inspection must be obtained before an appeal inspection may be made.

38 APPEAL INSPECTOR DESIGNATED BY CHIEF OF SERVICE:- An appeal inspection is never made by the inspector who made the complete inspection from which the appeal

was taken, but by an inspector designated for the purpose by the Chief of the Agricultural Marketing Service. (Section 57.27 of the Regulations.)

39 INSPECTORS SHOULD ASSIST APPELLANTS WITH APPEALS:- When an applicant is dissatisfied with the grade established on a lot of hay by an inspector, the inspector should advise him of his right of appeal and assist him in every way possible in making application for an appeal.

40 WHERE APPEALS MAY BE FILED:- Applications for appeals may be filed with any inspector, with any Federal hay supervisor, or with the Chief of the Agricultural Marketing Service and must be filed before the close of the second business day following the original inspection from which the appeal is requested. Inspectors should transmit such applications immediately to their supervisor wherever possible or to the Washington office of the Grain and Seed Division. An application for an appeal inspection should include the same information as is contained in an application for a complete or sample inspection. (Section 57.8 of the Regulations).

41 FEES AND CHARGES PAYABLE WHEN GRADE APPEALED IS SUSTAINED:- Before an appeal is filed, the inspector should, if possible, explain to the appellant that unless the complete or sample inspection from which the appeal was taken is reversed the appellant will be required to pay the appeal fee of \$4.00 plus the charges covering all expenses incurred by the inspector who makes the appeal inspection. It should be explained further to appellants that wherever two or more lots of hay are appealed the charges are prorated among all lots and the appellant would not be required to pay the prorated charges on those lots upon which the complete inspection is reversed. (Section 57.33 (d) of the Regulations).

CHAPTER 11 - INSPECTORS' NOTES

42 CERTIFICATES AND REPORTS BASED ON INSPECTORS' NOTES:- Each inspector will be furnished with notebooks or looseleaf printed forms on which to make his notes while inspecting hay. Inspectors must never depend on memory. All certificates and reports must be based on the notes made on these forms at the time of inspection. These notes should be very complete and will often contain material which should not be transcribed to the certificate. Notes should be made in regular order as the inspections are made.

43 COMPLETE CAREFULLY WRITTEN NOTES ESSENTIAL:-- The notes should be considered confidential, and the notebooks made a part of the permanent records of the inspector's office, being filed there as they are completed. They must be written sufficiently legible to be clear to any one who might need the record. Complete notes should be made of anything which should be entered on the certificate or which has any bearing on the grade assigned to the lot, or which, in the opinion of the inspector, should be called to the attention of the shipper for correction in future shipments or which indicates a violation of the act, also anything that may be of assistance to the applicant in handling the hay.

44 THE PREPARATION OF INSPECTORS' NOTES:- Most of the information in inspectors' notes is believed to be self-explanatory, but the following information is given for the guidance of inspectors:

(a) APPLICANT. Each note should show the name of the applicant for whom the inspection is made or his mark of identification.

(b) IDENTIFICATION. This should include the car initial and number, truck or trailer license number, location in warehouse, etc. (HIM 16c).

(c) LOCATION. Where the hay is located at the time the inspection is made. This may be a railroad yard, a warehouse, a public market, a farmer's barn, etc. (HIM 16d).

(d) SEAL RECORD. Accurate record should be made on the inspector's notes both of the numbers of the seals which may be broken by the inspector and of new seals which he may attach (HIM 76).

(e) QUANTITY. The quantity of hay should be the entire quantity to which the certificate applies, for example, carlot, approximately 12 tons in a warehouse, etc., not the quantity examined or seen (HIM 16b).

(f) DATE. The date should be that on which the inspection is made.

(g) PART INSPECTED. Under part inspected should be included the kind of inspection made, that is, complete bale inspection, complete inspection, or sample inspection. In the case of partial inspection, the portion of the lot examined should be described. For a car-door inspection, this can be the number of bales visible in one or two doorways; for a partial plug inspection the number of bales visible in plug and car; for an inspection of a lot in a warehouse, the number of bales visible on the sides and top of pile, or sides, ends and top of pile.

(h) CLASS AND GRADE. The statement for class and grade should be the same as that to be included in the inspection certificate. This is merely a statement of quality and condition based on United States standards.

(i) CERTIFICATE NUMBERS. The notes covering an inspection should always be given the same number as the certificate issued thereon. This is necessary in order to properly identify the inspector's notes with the certificate (HIM 61).

(j) INSPECTORS' INITIALS. The initials of the inspector making the inspection should be included in the space provided for this information.

(k) REMARKS. It is a good policy to include in the track notes any information other than the class and grade that may be helpful to the applicant in handling the hay. Such information is also of assistance to the inspection service in the event controversies arise relative to the grade of the lot of hay or a claim is made for damage to the hay in transit. Some of the remarks in the track notes that will be of assistance in this connection are: (1) Statements as to percentage of leaves, color, and foreign material, in case hay is distinctly on the line between two grades. (2) Whether the hay is newly harvested and, if so, whether the bales are loaded flat or on edge and the tiers of bales properly spaced. (3) Whether the hay is early or late cut. (4) Whether the stems of alfalfa are soft and pliable, with clinging foliage, or harsh and brittle and the leaves somewhat

shattered, etc. Notes are especially valuable for out-of-condition hay, cars loaded with mixed classes and grades, hay distinctly on the line between two grades, hay of superior value, and where a single factor such as foreign material pulls the grade down.

The inspector must be absolutely sure of the facts included in the track notes information as to the quality and condition of the hay, as such information will occasionally be the basis of claims on the railroads by shippers and will sometimes be used as a basis for settlements in court.

CHAPTER 12 - OPENING BALES

45 THE INSPECTOR HAS AUTHORITY TO OPEN BALES (Section 57.13 of the Regulations) IN ORDER TO EXAMINE THEIR CONTENTS AND CONDITION:- He should use this method especially to determine the leafiness of alfalfa, the degree of stain in timothy, and the condition of any kind of hay which is suspected of being musty, moldy, or heating. When baled hay is in a railroad car, it is an easy matter to open one or more bales without affecting the car weight appreciably or leaving unsightly broken bales on top of the load. This may be done by selecting a representative bale on the bottom tier in the doorway which has its end facing out. Cut the wires on this bale and then pull off one or two flakes to expose the character of the bale. The weight of the upper bales will prevent expansion of this sample bale and permit easy retying of the cut wires.

46 INDISCRIMINATE BREAKING OF BALES UNNECESSARY:- While the indiscriminate breaking of bales in inspection procedure is neither necessary nor desirable, it is sometimes essential to untie wires and open up a few representative bales completely to make a thorough examination for stain, leafiness, foreign material, injurious foreign material, or condition. When this latter practice is followed, inspectors must be most careful to retie the broken bales, as to leave broken bales scattered about invites criticism of the service. A useful method for determining the condition of hay inside the bales is to insert a hooked rod into a bale between the flakes and to draw out wisps of hay which may be examined for mustiness, moldiness, dampness, or heating.

CHAPTER 13 - SORTING HAY

47 WHEN TO SORT HAY:- There is no objection to the inspector assisting with the sorting of a lot of the hay into different classes and grades for educational purposes when time will permit. There is also no objection to inspectors assisting applicants, especially shippers, to sort and load lots of uniform grade or to acquaint them with Federal grade requirements when such work does not prevent the making of inspections on other lots of hay that are accessible for inspection and for which applications have been filed at the same point or other points. Inspectors should not attempt, however, to assist shippers to fulfill contracts for No. 1 or No. 2 hay by sorting out individual bales from barn, warehouse, or field lots of hay of diverse grade, when other inspections are awaiting their attention. Attempts to render assistance of this character to shippers often result in denying the service to other shippers who have exercised better judgment in making reasonably uniform lots of hay available for inspection.

48 UNSOUND HAY OR HAY BEING RAPIDLY HANDLED SHOULD NOT BE SORTED:- The inspector should make no attempt to sort hay definitely by grade when it is being rapidly transferred from a warehouse or truck into a car, or when the hay is not uniform according to such grade factors as bale sweat, must, mold, and caked condition. The inspector cannot properly examine individual bales if they are being rapidly handled during the process of loading.

CHAPTER 14 - HANDLING INSPECTIONS FOR OTHER GOVERNMENT DEPARTMENTS

49 INSPECTORS SHOULD MAKE INSPECTIONS FOR GOVERNMENT DEPARTMENTS WHENEVER POSSIBLE:- Government departments usually have no funds from which payments for inspections can be made. When an application for an inspection is received from a Government agency and the inspector is employed under a cooperative agreement with this Service, he should make such inspection if the Government agency making the application can pay for the service. In that event the inspector would charge and collect his regular fees and charges. But under these conditions, before making the inspection the inspector should make certain that the Government department is in a position to pay for the service. The War Department and certain other Government departments are unable to pay for inspection. In such cases this Service will appreciate it if the inspector will make the inspection without charge when he can do so without interfering with his regular duties. Certificates for such inspections should show the proper Government department as the applicant, the word "none" should be entered in the space provided for fees, and the certificate number should have the word "Gov't" written above it (HIM 52).

50 INSPECTIONS AT ARMY POSTS:- Ordinarily inspections at Army posts are made by veterinary officers of the Army who are licensed as Federal hay inspectors under the arrangement outlined in item 11 of this manual. However, when a civilian licensed inspector receives a request by mail or telegraph from a contractor or other interested person outside the Army for inspection of hay then located at an Army post where a licensed Veterinary Corps inspector is stationed, the request should be referred immediately to the licensed officer and the applicant notified of the action taken. If such a request is made in person or by telephone, the civilian licensed inspector should advise the applicant to make application to the licensed officer at the post. If, on inquiry, it is found that no licensed officer is located at the Army post or he is temporarily absent the civilian inspector to whom the application is made may make the inspection and collect from the applicant the usual fees and charges, providing it does not seriously interfere with his other duties to do so and he has obtained permission from the commanding officer of the post to make the inspection.

51 APPEAL FROM ARMY INSPECTION:- When any interested party is dissatisfied with the grade assigned to a lot of hay on complete inspection by a licensed Army inspector and requests a civilian inspector to inspect the lot in the post, he should be advised that his only recourse is to file an appeal. Such an appeal should be filed directly with the nearest hay supervisor or with the Grain and Seed Division, Washington, D. C.

52 IDENTIFYING CERTIFICATES UPON WHICH NO FEE IS CHARGED:- When a civilian inspector makes inspections without charge, such as those for Government departments, special attention should be given to identifying such certificates. Numbers for such certificates that have been issued without charge should have the word "Gov't" written above the certificate number. Since no fee is charged for such inspections this special method of identifying these certificates should be used for each inspection office.

CHAPTER 15 - PREPARATION OF INSPECTION CERTIFICATES

53 INSPECTION CERTIFICATE BY LAW PRIMA FACIE EVIDENCE IN U. S. COURTS:- The act of Congress under which hay inspection is conducted, provides that certificates issued by an authorized agent of the Department shall be received in all courts of the United States as prima facie evidence of the truth of the statements therein contained. The term "prima facie evidence" as thus used means such evidence as will be sufficient for the proof of a particular fact until contradicted and overcome by other evidence. Inspectors should give careful attention to the preparation of certificates, so that the evidences of class, quality, condition, identification, etc., which are recorded on them may be in accordance with the facts. It should be understood, however, that certificates do not excuse failure to comply with any of the regulatory laws, such as the Food, Drug, and Cosmetic Act (HIM 12) and the Produce Agency Act enforced by the U. S. Department of Agriculture.

54 UNIFORM TERMS SHOULD BE USED IN PREPARING CERTIFICATES:- Uniform terms prescribed in the Federal hay standards, the regulations, this manual, and other official publications must be used by inspectors in preparing inspection certificates.

55 INFORMATION ON CERTIFICATES OTHER THAN THAT COPIED FROM INSPECTORS' NOTES:- Information contained in the inspection certificate should be copied from the inspector's notes. In addition to such information, the inspection certificate must show the official station of the inspector, the inspection fee applicable at the point where the inspection is made and the charges (if any) incurred by the inspector in making the inspection. The fee and charges may or may not be included in inspectors' notes depending on local conditions.

56 REVIEW OF PREVIOUS INSPECTIONS:- When an inspector is called upon to inspect a lot of hay on which one or more previous inspections have been made, he should include in the certificate below the grade and class designation a review of all previous inspections at the same place. Such review should include the following, in the order named; the kind of inspection made, that is, whether partial or complete, the date the inspection was made, the certificate number, the quantity of hay seen in the case of a partial inspection, and the grade and class of part inspected.

57 THE APPLICANT'S NAME OR IDENTIFICATION SHOULD BE ON EACH CERTIFICATE:- In order to provide necessary information for accounting purposes at Washington, the name of the applicant or some definite identification mark for the applicant must be recorded on each certificate issued in the space provided therefor at the right

of the space provided for "fees". The use of names or identification marks for this purpose is optional with applicants or the organizations with whom the Service holds a contract for inspection service. Wherever identification marks are used, a list of such marks, together with the individuals or firms they represent, must be filed in the supervisor's office as well as in the Washington office.

58 **CERTIFICATES SHOULD BE CAREFULLY CHECKED:-** Inspection certificates should be legible and should contain no alterations, erasures, or abbreviated terms other than U. S. for United States and No. for number in the grade designations. After certificates are written and before they are signed and distributed they should be carefully checked to determine if the information contained in them is the same as that contained in the inspector's notes.

59 **CORRECTED CERTIFICATES:-** When an error in an inspection certificate is not discovered until after the certificate has been sent out and it is necessary to correct it, the original and copies which have been mailed should be recalled and a corrected certificate and copies issued with an explanatory letter calling attention to the error. Above the number on the certificate form the words "corrected certificate" should be written and on the last line under "grade and class" this statement should appear; "This certificate is issued in lieu of and therefore supercedes certificate No. ____." The original and copies of the recalled certificate will be disposed of in accordance with instructions governing the disposal of canceled certificates given in item 61.

60 **CANCELED CERTIFICATES:-** Occasionally an inspector may inspect a lot of hay other than that included in the application or he may make an inspection through error. When, in such cases, a certificate has been issued and copies distributed, the certificate must be canceled. When certificates are canceled, the original and all the copies should, if possible, be recovered by the inspector. In all cases where the certificate cannot be recovered immediately, a notice of cancellation must be sent out and a copy thereof should be furnished to each party who received a copy of the certificate. Also, such notices should be placed on exchange bulletin boards or other prominent places where they will be read by the trade. An inspector has no authority to cancel a certificate where an inspection has been made in conformity with the application.

61 **CERTIFICATES PRE-NUMBERED:-** All inspection certificates are now pre-numbered so that the inspectors will not have to number the certificates as they are issued. Numbers assigned to inspection certificates shall be placed on the inspectors' notes because they furnish identification of lots of hay inspected and are necessary in the keeping of records in the field as well as in Washington. Since the information in inspection certificates is copied from track notes the certificate number should be entered on the track notes from which the certificate was written. The numbered certificate blanks should be used in the order in which they are numbered using the lowest number assigned to the inspector or office first and continuing to use from the pads of certificate forms until they are all used without regard to the fiscal year. In other words, you will not begin with No. one (1) at the beginning of the fiscal year as was done heretofore. Certificate forms that are spoiled due to mistakes in transcribing the inspectors' notes will be marked "canceled" or "void"

over the number and the original and all copies will be returned to the Washington office through the district supervisor, except that the inspector will keep one copy for his files and the supervisor will keep one copy for his files before returning the remainder to Washington. This is done in order that each file of certificates will contain all consecutive numbers issued to any given inspector or office.

Each type of certificate will have a letter before the number designating the kind of certificate. The letter "C" will appear before the number on Complete Certificates, the letter "P" on partial certificates and the letter "S" on Sample Certificates. A special certificate has been printed for use by Army inspectors. This series is designated by the letter "A".

62 EXTRA COPIES OF CERTIFICATES:- A supply of pre-numbered copies are furnished with each original certificate form which will be sufficient under ordinary circumstances. Occasionally inspections will be made where additional copies of certificates will be needed in order to furnish copies to all interested parties. Requests will also be received for copies some time after the certificate was issued. Extra copies of the certificate can be issued using the unnumbered copies which will be furnished from Washington. Such copy will be given the same number as the original of which it is a copy.

63 FILING PARTIAL AND COMPLETE CERTIFICATES:- It will be necessary to file the copies of the partial and complete certificates separately because they will be given different blocks of numbers and by having a separate file for the two kinds of certificates it will be possible to file by numerical order as well as date.

64 OUTBOUND CERTIFICATES:- Authority is granted inspectors to mark certificates with the word "outbound" in those cases where the same railway car or other vehicle at any inspection point contains a lot of hay different from the lot which it contained at the time of inbound inspection, as the result of handling hay through warehouses or on team tracks, and when inspection is called for, subsequent to the inbound inspection. Wherever conditions exist to justify the practice of marking inspection certificates "outbound", for the purpose of preserving the integrity of the Federal hay inspection service, inspectors should adopt the policy of placing the word "outbound" in the upper right-hand corner of the certificate above the certificate number.

CIRCUMSTANCES IN WHICH THE USE OF "OUTBOUND" CERTIFICATES IS ADVISABLE:- A car of hay arrives at a terminal market and is inspected. It is then moved to a private warehouse where the hay is removed, and where hay from the warehouse, of a different grade from that included in the inbound shipment, is loaded in its place. The owner then applies for inspection. When such an inspection is made, the car initial and number included in the certificate for the inbound inspection are the same as those shown in the certificate for the outbound inspection. In these circumstances it is advisable to mark such certificates "outbound", in order to prevent possible misrepresentation or to assist in locating the correct certificate in case there is any complaint.

65 STATEMENTS FOLLOWING GRADE AND CLASS:- The statements that are included in inspection certificates following grade and class fall into two general groups, as follows: (1) Those prescribed (HIM 137) and optional (HIM 138) statements which refer to grade, class, and quality which should be included in the column headed "Remarks".

Such statements should be written on the same line as the grade and class designation or portion thereof to which they apply. (2) Those statements relative to leaky roofs (HIM 107), poor baling (HIM 132), transferred lots of hay (HIM 67), reviews of previous inspections (HIM 56), etc. which are generally applicable to the entire lot and which should be written at the bottom of the space provided for "grade and class."

66 FEES AND CHARGES MUST BE SEPARATED:- Fees must always correspond with the schedule which has been approved by the Chief of the Service for the point where the inspection is made. The fee is the fixed and established amount paid for the inspection, while the charges are the variable amounts collected for expenses incurred in making the inspections, such as cost of travel and service charges for making inspections at points other than the inspector's official station. These two items fees and charges must be clearly separated, because the percentage required by the Service in its contracts governing inspection services is determined from the fees only. Section 57.33(b) and (c) of the Regulations. The fee should be calculated at the rate for the kind of inspection made on the entire quantity of hay covered by the certificate and not for the quantity examined by the inspector.

67 IDENTIFICATION OF TRANSFERRED HAY:- When hay is transferred from one vehicle to another for any cause such as a "bad order" car or broken down truck, etc., the identification of the vehicle from which the hay is unloaded and the one to which the hay is transferred may be included in the certificate (HIM 271). However, when both identifications are included in the certificate, the transfer must be made in the presence of the inspector or be done under the jurisdiction of an agent of a public carrier or public warehouse.

68 NO CHANGES OR ALTERATIONS IN INSPECTION CERTIFICATES:- The purpose of an alteration in an inspection certificate after it leaves the inspector's hands is, of course, to deceive buyers as to the true grade or condition of the product. The Department of Agriculture has warned against any changes, erasures, or alterations, in grade statements or percentage statements. The inspectors are cautioned to be very careful to issue no certificate which shows any alteration or erasure. In other words, if a certificate when written is found to have been incorrectly transcribed from the notes, do not correct it by erasing or changing the part that is wrong but mark canceled or void and rewrite it using the next numbered certificate form. The canceled or void certificate form must be sent to the district supervisor according to instructions in item 61. When this procedure is followed any alteration or erasure in a certificate will indicate that it has been changed after leaving the inspector's office. To safeguard the public from this particular fraud, the Government will prosecute for altering farm products' inspection certificates.

CHAPTER 16 - DISPOSITION OF INSPECTION CERTIFICATES

69 The disposition of inspection certificates is governed by Section 57.18 of the Regulations.

70 WHO MAY RECEIVE CERTIFICATES:- Only one original certificate should be made for each inspection. As many carbon copies of certificates may be made as are deemed

necessary. The applicant should be furnished with the original and one carbon copy immediately upon issuance. Upon request, interested parties who have bought or sold the hay on the basis of United States grades, also interested carriers and public warehouses, are entitled to copies of any certificate. Persons merely negotiating for the purchase of the hay are not entitled to copies of the certificate. Copies may be furnished disinterested parties with the consent of the applicant.

71 EVIDENCE OF INTEREST REQUIRED BEFORE OBTAINING GRADE INFORMATION:- When an inspector receives a request for grade information or a copy of the inspection certificate from any person other than the applicant, the inspector should require him to furnish evidence to show that his part of the transaction was based on United States grades, or to show that he represents an interested public carrier or public warehouse, prior to giving out grade information or certificate copies. A written statement to this effect will be satisfactory in most cases. However, the inspector may require the applicant to furnish a copy of his contract covering the transaction, if he considers such evidence necessary. Disinterested parties occasionally buy and sell hay on the basis of descriptive terms, then request the inspector to furnish them grade information for use in sustaining rejections, obtaining discounts, etc. Federal inspection certificates should not be issued in support of practices of this kind.

72 FURNISHING GRADE INFORMATION BY TELEPHONE:- Inspectors frequently receive telephone calls requesting grade information on lots of hay. When such calls are received and before the grade information is furnished, the inspector should determine if the person desiring the information is an interested party (Section 57.19 of the Regulations), and not some one who is merely negotiating for the purchase of the hay. It is necessary to take this precaution in order to prevent disinterested parties from obtaining grade information by telephone for use in completing a transaction based on descriptive terms or for transmittal to country shippers or hay consumers who have bought or sold their hay on the basis of description.

73 PERSONS NOT ENTITLED TO GRADE INFORMATION:- A person other than applicants for inspection who buys or sells hay on the basis of description and who later requests a copy of the inspection certificate for use in making a settlement or to sustain a rejection is not entitled to a copy. The inspector should instruct such persons to make application for inspection or to obtain a copy of the certificate through the applicant for the inspection.

CHAPTER 17 - CERTIFICATES OF PRESERVED IDENTITY

74 CERTIFICATES OF PRESERVED IDENTITY FOR APPLICANT'S USE ONLY:- A form is provided which applicants for inspections may use, if they desire, to assist them in establishing the identity of hay that has been unloaded from a railway car, truck, barge, or ship, but that has not had its identification with the carrier preserved and recorded by a railway or public warehouse. Licensed Federal hay inspectors must neither use nor sign certificates of preserved identity for the purpose of identifying any lot of hay with any particular car, truck, barge, warehouse, or other location, nor record any statements in certificates to the effect that a lot of transferred hay is represented by any person as having been identified with any particular car, truck, barge, warehouse, or other location. In other words, certificates must show only the exact facts as to the identification and location of hay that are found by the inspector at the time he makes the inspection. Identification statements on certificates which cannot be substantiated by the inspector weaken the value of certificates as prima facie evidence. If interested parties wish to identify with a certain car, truck, etc., hay which has already been unloaded into a private warehouse barn, or other place, it will be necessary for them to do this by means of their own

certificates of preserved identity or affidavit. However, inspectors may assist applicants for inspection in preparing certificates of preserved identity by means of the form following. The above rule does not affect the status of carlots of hay unloaded into railroad or other public warehouses. In such cases the car initials and number as shown by the warehouse records may be used for the identification of the hay.

SUGGESTED FORM OF CERTIFICATE OF PRESERVED IDENTITY

I, HEREBY CERTIFY that on the day of 194 , the hay in in the City of , submitted to Federal Hay Inspector..... for his inspection at that time, and represented to him as having been taken from car was personally known to me to comprise all of the hay removed from said car between the time of its arrival in the yards of the Railroad in the City of..... and the time when said inspection was made, and no other hay, and that in unloading the contents of said car into said warehouse the identity of the hay was wholly and entirely preserved.

IN WITNESS WHEREOF, I have hereunto fixed my signature this..... day of 194

.....
(Name)

.....
(Title)

CHAPTER 18 - CAR SEALS AND RECORDS

75 BREAKING CAR SEALS:- Inspectors have no authority to break seals on cars or to go into a railroad yard without first obtaining permission from the railroad company. Railroad requirements in this matter vary at different points. Each inspector should consult with the agent of each road at the point where he is stationed and endeavor to make arrangements for having quick and convenient access to cars of hay to be inspected. Where difficulty is found in doing this, supervisors will be glad to advise and assist inspectors in every way possible.

76 SEAL RECORDS:- Accurate records should be made in the inspector's notes both of the numbers of the seals which are broken by the inspector and of the new seals which he may attach. Inspectors must always comply with all requests from carriers or other interested parties with regard to furnishing information about records.

77 INSPECTORS RESPONSIBLE FOR SEALING CARS:- The sealing of cars is normally done by railroad agents but if negligence is apparent the inspector should assume the responsibility of closing and sealing cars which he has opened. Complaints have been made by carriers that inspectors do not always close cars properly and that they have sometimes pulled bales of hay from cars and left them lying on the ground. Except in cases where the breaking of seals and the closing of doors are handled in an organized manner by a responsible trade association, the inspector should make a record in his track notes of all cars found without seals or with broken seals, together with statements about the time of the observation and any pertinent facts about the lot of hay. In case of shipping point inspection, and in those cases where the railroad agent is not in a position to attend promptly to the sealing of cars subsequent to inspection, the sealing of cars by the inspector is often necessary to insure no substitution of other hay after the inspection has been made.

CHAPTER 19 - HAY SAMPLES FOR SUPERVISION PURPOSES

78 SAMPLES TO BE SUBMITTED AT REGULAR INTERVALS:- Inspectors are required to submit to supervisors at regular intervals samples of hay for supervision. The inspector will benefit little from submitting samples that are easy to grade and that do not represent a specific grading or classification problem.

79 SAMPLES SUBMITTED FOR COLOR MEASUREMENT:- A method for accurately determining the percentage of green color of hay has been developed in the Department laboratories. The inspector's ideas of percent green color are kept in line with the standards by a system whereby he is required to submit samples to the laboratories for color measurement. These samples may be analyzed and returned to the inspectors as type samples. Other type samples which show grade lines as to leafiness, color, foreign material, and class mixtures may be sent to the inspectors from time to time from the laboratory.

80 SAMPLES SHOULD NOT EXCEED FOUR POUNDS IN WEIGHT:- Samples selected for mailing to the supervisor should be as large as possible but should not exceed four pounds in weight. Bags for use in mailing samples and blank forms for recording data on samples may be obtained from supervisors. Postage due tags supplied by the Division should be used in mailing samples to supervisors by all inspectors who are not government employees.

81 OBTAINING SAMPLES:- Ordinarily samples may be obtained from broken bales around inspection tracks or warehouses without cost to the inspector. However, if it becomes necessary to remove a slug from an unbroken bale (HIM 45), it may be done with hay in carlots without damaging the bale in any way, by clipping the wires at the end of a bale that has other bales above and below it. Such a procedure will permit the inspector to remove a small slug from the bale and rewire it without damaging the bale to any appreciable extent.

82 EXCHANGE OF SAMPLES IMPORTANT:- It is fully understood that the inspector's ability to grade small slugs of hay is not an accurate measure of his qualifications as a commercial inspector; on the other hand, the exchange of samples between the inspector and the supervisor for the purpose of assisting the inspector with classification problems and the determination of grading factors is a feature of the supervision work that is very important.

SECTION III - EXPLANATION AND APPLICATION OF HAY AND STRAW STANDARDS

CHAPTER 20 - DETERMINING CLASS AND GRADE

83 ORDERLY DETERMINATION OF CLASS AND GRADE:- Clear thinking in the application of the United States standards for all groups of hay demands that the class and grade be determined separately. This is necessary because of the fact that the class is determined by the kind or the mixtures of various kinds of grasses and legumes, one with the other, while the grade is determined by such factors as green color, texture, condition, foreign material, and, in case of alfalfa, soybean hay and lespedeza, the degree of leafiness. The grading factors in the standards for the various groups of hay are not uniform. Green color, foreign material, and condition are grading factors in all classes of hay. Amount of leaves and texture are grading factors only in certain classes. Therefore class should always be determined first because grading factors are used in some classes of hay that need not be considered at all in other classes. Example - the leafiness of alfalfa is used as a grading factor in the class Alfalfa but it is not used in the class Alfalfa Heavy Grass Mixed.

84 ESTABLISHING THE GRADE BY ELIMINATING UNSUITABLE GRADES:- The elimination of wide errors in hay grading and the assigning of a practical class and grade are matters of easy accomplishment for the inspector who learns to make use of the mental processes of elimination in the selection of the class and grade to apply to the hay under inspection. This process of reasoning is that of quickly eliminating the plainly impractical classes and grades from consideration and thus reducing the problem at once to a consideration of not more than two classes or two grades which might apply to the hay in question.

It is easy to check off the plainly unsuitable classes or grades and to thus simplify the problem for final consideration. For instance, in the classing of hay in Group II, Timothy and Clover Hay, the type of hay is easy to recognize that is sufficiently pure to be of the class Timothy or the class Clover. These easily recognized classes thus may be applied or eliminated instantly with almost no chance for an error. If eliminated and if the hay plainly shows no grass content greater than 10 percent all classes specifying grasses in the mixture may be eliminated. Thus by elimination only three possible classes remain, namely: Timothy Light Clover Mixed, Timothy Medium Clover Mixed or Clover Light Timothy Mixed. The inspector should then concentrate his attention on the clover content. If it is not present in great quantity so as to give the hay a distinct clover appearance he can eliminate the class Clover Light Timothy Mixed, thus reducing his problem to a choice between Timothy Light Clover Mixed and Timothy Medium Clover Mixed.

The final classing is now comparatively easy and may be done accurately in most cases by a common sense consideration of the proportion of clover to timothy. No wide errors are possible in this procedure and the greatest mistake possible is between two contiguous classes, namely: Timothy Light Clover Mixed and Timothy Medium Clover Mixed, either one of which would give a practical inspection if not absolutely correct providing the grade or quality of the hay is correctly given.

Many words are required to create a word picture of the elimination process above described, yet in practice the process is very rapid of application if the inspector has developed this mental habit of selecting the class or grade by the process of first eliminating all definitely unsuitable classes or grades. It is a process of subtracting the easily seen factors so as to bring the real problem out for determination. Experienced supervisors often see new inspectors floundering around over technical specifications and making wide errors when a common sense application of this process of elimination would give the inspector either the correct class or grade, or at least an efficient and practical grade designation very close to the correct one that would avoid appeals and disputes.

Inspectors should give careful thought to the development of a mental process of reasoning such as is here outlined. The process is highly practical and applicable to any grading factor or class specification. With foreign material as a grading factor, for example, the first step should be to test out or consider the application of the two extremes in the specifications, namely: No. 1 maximum or Sample grade minimum. If neither a low nor a high content applies the problem is reduced to grades 2 and 3, and common sense will dictate to the inspector whether the foreign material content is closest to No. 1 or Sample Grade, thus making a practical decision possible for either No. 2 or No. 3, as the case may be. Problems in leafiness, color, and mixtures of any kind may all be reduced to their simplest elements by this same process of eliminating the easiest recognized types, or what may be called the extremes, from the problem.

85 AVERAGING CLASSES AND GRADES:- When the lot of hay under inspection is nearly uniform, or with only an occasional bale varying from the common class and grade of the lot, it is practical and advisable to write the certificate to show the average class and grade for the entire lot inspected. Very strict grading of many individual bales in a lot of hay creates difficulties in settlements between buyer and seller and sometimes makes it difficult to fill a contract. For these reasons all slight differences in the class and grade of individual bales should be averaged in determining the class and grade for the entire lot. On the other hand the class and grade must be determined for each bale in every case where two or more distinct classes and/or grades are visible in the lot of hay under inspection. No attempt should be made to strike an average between distinct variations in the class or grade of several bales and under no circumstances should Sample grade bales be averaged with the bales of any numerical grade. When distinct differences are noticed between individual bales, a tally should be made of the number of bales inspected of each class or grade and the certificate written accordingly. For cases of lots that are partly heating, hot, wet, musty, moldy, or caked, see HIM 106 to 109.

No absolute rules can be given as to when class and grade may be averaged for the lot of hay or when individual bales must be graded. To a great extent the method must be left to the common sense and good judgment of the inspector and to the general rules herein given. When it is apparent to the inspector, however, that the hay in the lot is all from one meadow, or from one cutting of alfalfa, and that the variations in class or grade are due largely to the variations incidental to production, he may average the bales with justification if the variations are not wide.

CHAPTER 21 - GRADE INDICATIONS FROM EVIDENCES OF MATURITY, CURING METHODS AND WEATHER DAMAGE

86 VARIOUS METHODS USEFUL IN APPRAISING HAY FOR GRADE:- It is best not to rely on any single method in appraising hay for its proper grade but rather to appraise the hay with different methods prior to making a final decision. The grading factors in the United States standards for all groups of hay are the final test for the dividing lines between the grades. The inspector's problem of applying the standards is made easier, however, if he assembles all facts about the time of cutting, methods of curing, and character of the damage which correlate with the standards, which affect the physical appearance of the hay, and which indicate palatability and feed value. The accurate observation of such facts is of material assistance in deciding whether the hay is No. 1, No. 2, or other grade.

All samples of hay have certain general characteristics and qualities that are typical of one grade or another. Usually these general characteristics are plainly visible in the sample and can be assembled in the inspector's mind as guides to the correct grade. In fact the grade specifications for No. 1, No. 2, etc., may be considered as simplified expressions of the sum total of the quality characteristics of the hay.

Thus the approach of the inspector to the lot of hay upon which he wishes to determine the grade should be with the idea of first obtaining an impression of mass color, and second of obtaining evidence relative to maturity and the character and extent of the damage to which the hay was subjected during the field curing or storing periods of production. All these facts, which can be seen easily in the sample, have a direct bearing on the grade and should be assembled in the inspector's mind at the outset. Then with this general evidence in mind, the inspector can proceed to his final determination of the grade according to green color, foreign material, or leafiness, and employ the supplementary evidence of quality in all cases where the grade is in doubt and the sample on the line perhaps between two grades. In the succeeding items of this chapter many facts about the relationship between time of cutting, methods of curing, character of damage and the grade of hay are given to assist inspectors in utilizing such observations in the grading of hay.

87 QUALITY ACCORDING TO METHODS OF PRODUCTION:- The quality of all hay falls into four general divisions according to the conditions and methods under which it was produced. The United States standards approximately define these quality divisions which vary according to the maturity, extent of weather damage and methods of curing and handling. Evidence can be found usually in all lots of hay as to the character and extent of the weather damage and as to the stage of maturity at time of cutting. Deductions from such evidence are of material assistance to the inspector in forming his opinion about the grade of the hay. A brief sketch of these four divisions is given in succeeding paragraphs. In each of these four divisions the term "early cut hay" refers to hay that has been cut according to the time of cutting recommendations given on pages 60 and 61 of the Handbook of Official Standards.

DIVISION I (GRADE 1). Early cut hay of all kinds that was cured with little or no damage from rain. Slight discoloration from light showers, dews, fogs, sun bleaching and sweating, are tolerated in early cut hay and usually do not reduce the

percentage of natural green color below the No. 1 color specifications in the various hay groups. Under these conditions the leafiness of alfalfa or soybean hay is usually high enough for the No. 1 grades unless the hay was overdried and the leaves shattered.

DIVISION II (GRADE 2). (A) Early cut hay of all kinds which received more than slight damage, though not severe damage, from several light showers, several heavy dews, sweating or excessive sun bleach in the swath. (B) Late cut hay of all kinds, though not fully ripe, which was cured with little or no damage from the elements. In either case, the discolorations are usually sufficient to reduce the natural green color below the requirements for the No. 1 grades. In either case, alfalfa or soybean hay rarely has less than 25 percent leafiness and may have 40 percent or more leafiness, according to whether it was cut early or late and whether gathered, stored, and baled while either in a tough or overdried condition.

DIVISION III (GRADE 3). (A) All kinds of early cut hay, or hay cut prior to being fully ripe, which received severe damage in the swath, windrow or cock from heavy rain or from numerous showers or excessive sun bleach. (B) Hay of all kinds cut so late that seeds are ripe or well formed, leaves brown or lost, and the stems woody from maturity and natural curing. In either case the discolorations are distinct, usually brown or reddish in color, and sufficient to reduce the percentage of natural green color below the minimum requirements for the No. 2 grades. Alfalfa cut after seed pods are formed usually becomes distinctly stemmy and lacking in leafiness, although exceptions are found in crops hastened to maturity by dry weather. Rain damage or excessively sweated alfalfa also may become badly discolored but retain sufficient leafiness for either the No. 1 or No. 2 grades. Hay in Division III may have a low percentage of green color due to weather damage or overripeness, but it must be sound and sweet with a feed value only relatively less than for hay in Division II. No hay that is badly stained, badly overripe, badly weathered, musty or moldy may be included in this division.

DIVISION IV (SAMPLE GRADE). Hay of all kinds cut at any stage of maturity that has been so severely damaged by rain, fermentation, or long exposure to the elements as to be moldy, musty, badly stained, or severely leached and discolored. Also hay of all kinds that became badly overripe, weathered and brown in the field prior to cutting. Hay that is sound is in Division IV only when of distinctly low quality and feed value.

88 EVIDENCES OF MATURITY IN TIMOTHY HAY:— The stage of maturity of timothy prior to cutting is determined easily by rubbing a few timothy heads in the palm of the hand. If cut not later than full bloom there will be no ripe seeds and parts of the flowers can be seen. Occasionally a few small, green, partly formed seeds will be found in early cut hay. The early dough stage of maturity is revealed when there is an appreciable number of half formed green seeds. Full maturity in timothy is determined from the plump, brown seeds which shell out easily from the whitish, dry glumes or chaff.

In an approximate manner seed maturity correlates with percent green color

and therefore with grade. Timothy with fully ripe seeds usually has yellow-brown stems and many brown leaves that place the hay in the No. 3 grade according to color. Timothy with many plump, green seeds that are not fully ripe is far more likely to have the color of No. 2 hay than No. 1 because of the influence of maturity on leaf and stem color, although exceptions are found at times in Northern climates. Timothy cut not later than full bloom is normally No. 1 in grade unless rain, many dews or long continued sun bleach have reduced the percentage of natural green color that is normal in early cut hay.

89 EVIDENCES OF MATURITY IN CLOVER HAY:- The stage of maturity of clover prior to cutting is determined by observing the color and condition of the bloom, and by observing the maturity of the seed if any are present. Clover that is cut not later than full bloom will have numerous clover heads that show the red or purplish-red blossoms of the red clover or the pink or pinkish-white blossoms of alsike clover. Clover cut at this stage will have no seeds or only a few shrunken seeds. A stage of maturity between full bloom and full maturity is indicated by the brown color of all the clover heads and the presence of small, yellowish-brown seeds. Full maturity is indicated by the dark brown color of the clover heads and the presence of plump, mature seeds. Clover stems and leaves turn dark brown when the seeds have ripened and such hay usually grades No. 3 according to the color specifications irrespective of weather damage. Exceptions are sometimes found, however, in alsike clover hay which retains its natural color longer than red clover. As a general rule, clover that was cut later than full bloom, and when the majority of the heads have turned brown, develops a greenish brown color that is typical of the No. 2 grade. The No. 1 grade for clover requiring 45 percent green color, practically demands that the clover shall be cut not later than full bloom.

90 EVIDENCES OF MATURITY IN ALFALFA HAY:- The stage of maturity of alfalfa prior to cutting is determined by observing the condition of the bloom and the texture and woodiness of the stems. Alfalfa that was cut in the bud stage may be noted from the buds at the tips of the stems and from the complete absence of the purple flower petals. Bud stage alfalfa, also, is usually very leafy and the stems relatively fine and pliable. Alfalfa cut in the early bloom stages is evidenced by some purple flower petals and some buds, by stems that are harder than in bud stage alfalfa but not so distinctly woody and hard as for alfalfa cut after blooming is past, and by a degree of leafiness that is distinctly apparent compared to the stemmy character of late cut alfalfa. Alfalfa that is cut after the full bloom stage is usually indicated by the relatively hard stems, by the presence of seed pods, and by a deficiency of leaves.

Indications of nearly mature alfalfa are found in the brown rust spots on the stems, in the weak faded green color and in the presence of numerous brown seed pods containing partly filled seeds. Fully matured alfalfa is indicated by the presence of many dark brown seed pods containing plump, filled seeds. Seed pods are found occasionally on leafy alfalfa hay (40 percent or more leafiness) when the maturity of the alfalfa has been hastened by drought or hot weather but such cases are exceptions only to the general rule. This type of alfalfa cannot be graded Extra Green, Green, or No. 1 when a majority of the stalks bear brown and/or black seed pods (HIM 157). In the absence of weather damage, however, the higher grades are associated with the early cut alfalfa because leafiness and color diminish with the advanced stages of maturity.

91 EVIDENCES OF MATURITY IN PRAIRIE HAY:- The stage of maturity of prairie grasses prior to cutting is determined by observing the texture, the development of seed heads and the color of the plants. Prairie grasses that were cut before the plants started to turn brown from dry weather or maturity are indicated usually by a fine, leafy hay which has few distinct stems and few, if any, seed heads. Prairie grasses that were cut late in the season usually have a large amount of faded and dull reddish-brown color as well as many distinct, relatively large stems (HIM 165) some of which have seed heads. Maturity is of less value to the inspector as an aid to the determination of grade in the prairie hay group than it is in any other group of hay. For this reason the inspector should be very careful in the use of maturity of prairie hay as an index to grade. The principal effect of maturity in prairie hay is to lower the percentage of green color.

92 EVIDENCES OF MATURITY IN JOHNSON HAY:- The stage of maturity of Johnson grass prior to cutting is determined by observing the stage of development of the seed heads and the texture of the stems. Johnson grass that was cut not later than when one-fourth of the seed heads have emerged from the boot is indicated usually by the presence of some immature, white seed heads but no mature purple seed heads. Hay cut at this stage is not usually of course texture. Johnson grass that was cut after the seed heads have fully emerged from the boot is indicated usually by the presence of numerous mature, purple seed heads and relatively coarse stems (HIM 170). Mature seed heads of Johnson grass may be detected by the purple or reddish-purple color of the seed hulls which are somewhat similar in appearance to the threshed seeds of sorghum, or by the presence of the seed stalks from which the seeds have been shattered. The immature seed heads of Johnson grass are white or yellow-white in color.

93 EVIDENCES OF MATURITY IN GRAIN HAY AND WILD OAT HAY:- Maturity of grain hay and wild oat hay is a very important factor in the determination of grade since maturity is one of the grading factors (Pages 22 to 25 Handbook of Standards). The inspector, therefore, should always check the maturity of the grain or wild oats before he places a grade on these kinds of hay.

The stage of maturity at which grain hay or wild oat hay was cut, is determined by observing the stage of development of the grain kernels and the color of the plants. The stage of development of the kernels can be examined by rubbing the heads in the palm of the hand in order to thrash out the kernels of grain. Grain hay or wild oat hay that has been cut in the milk stage or before will be indicated by the presence of small shriveled kernels or by portions of the floral parts, if the grain was cut before blooming. Early dough stage maturity is indicated by half-formed kernels. Late dough stage maturity is indicated by kernels which are almost completely filled out, while full maturity is indicated by the plump kernels such as are found in thrashed grain. There is a distinct correlation between seed maturity and the color of grain and wild oat hay since the amount of yellow color increases in proportion to the maturity of the kernels. The seeds of wild oats usually fall out very soon after reaching maturity and therefore the heads of overripe wild oat hay will often consist of empty glumes.

94 EVIDENCES OF MATURITY IN VETCH HAY:- Maturity is also a grading factor in vetch hay (Page 24 Handbook of Standards) and the same care in checking the maturity of the vetch before determining the grade should be observed as in grading grain hay.

The stage of maturity at which vetch hay was cut is determined by observing the relative number of pods and flowers on the plant and the development of the seeds in the pods. The stage of development of the seeds can be determined by breaking the pods open. Vetch hay pods that are one-half filled can be recognized by the presence of the half-formed seeds in the pods. Since vetch flowers through a considerable period of time and from the lower parts of the plant towards the top, the lower parts of the plant may have seed pods in which the seeds may be quite plump while the upper parts of the plant may have flower buds or open flowers.

95 EVIDENCES OF MATURITY IN SOYBEAN HAY:- The stage of maturity at which the soybean hay was cut is determined by observing the stage of development of the soybeans and the development of the seed pods. Soybean hay that is early cut will be indicated by the presence of small pods in which little or no seed has been formed. Soybean hay cut when the seeds are half developed will be indicated by well developed pods which contain small shriveled seeds, while fully matured soybean hay will be indicated by large pods in which the seeds are plump and well developed.

There is a distinct correlation between the development of the seeds in soybean hay and the percentage of leaves. The leaves tend to fall from the plant as the seeds develop, and when full maturity is reached very few leaves are left on the soybean stalks. This correlation is more evident in those varieties which are normally used for seed. The hay varieties tend to hold the leaves even after the seed are quite mature.

96 EVIDENCES OF MATURITY IN GRASS HAY:- The stage of maturity of such plants as bluegrass, redtop, cheat, and those grasses, sedges, and rushes that are found in mountain hay such as Colorado South Park hay, is determined by observing the development of the seed heads and the color of the plants. Kentucky bluegrass, cheat, and some of the other early maturing grasses, tend to turn yellow very soon after the plant has bloomed. Redtop heads before bloom are usually green but turn purple afterwards. The plants that make up Colorado South Park hay often turn brown or yellowish-brown very soon after the heads have developed, so that if allowed to stand too long it deteriorates rapidly in quality. Sometimes the browns or yellowish-browns of this kind of hay are caused by frost which may occur at any time during the growing season and therefore are not always an indication of maturity. The principal effect of maturity on most grass hays is to rapidly diminish the percentage of green color. This tendency is not apparent in a few grasses such as quack grass and Canada bluegrass.

97 EVIDENCES OF SUN BLEACH:- Swath bleach is the most common form of sun bleach and is found to a greater or less extent in all kinds of hay that are cured in the swath. Swath bleach in alfalfa is often severe in the hot, dry climate of the Southwest where the sunlight is very intense. It is very apparent also in those timothy producing regions where it is a common practice to fully dry the hay in the swath prior to raking and loading. The exact effect of sun bleach on the feeding value of hay is not known, but it certainly does not injure the feeding quality to the same extent as does rain damage. Sun bleaching reduces the natural green color of hay and develops a bright, yellow color in its stead, which affects sale value. Small amounts of sun bleach in hay otherwise undamaged are not sufficient usually to lower the green color below the minimum color requirements for the No. 1 grade. Appreciable amounts of sun bleach, however, must be taken into consideration in determining the grade by the color specifications. The bright, yellow color of such bleach does

not reduce the "percent green" as rapidly, however, as the brown and reddish-brown colors caused by maturity or rain damage.

98 EVIDENCES OF FERMENTATION:- The complete and proper curing of hay includes a certain amount of fermentation. This fermentation is popularly known as sweating, (HIM 128) and if not carried to excess, increases the aroma, palatability, and feed value of the hay. Often excessive sweating takes place in the stack, mow, or bale, which causes a distinct loss of green color, and if the sweating is severe enough causes the development of objectionable molds and the loss of feeding value. Light fermentation sometimes causes a grey-green color in hay without injuring it otherwise. If the fermentation is moderate the hay will have a brownish-green color and if it is severe it will be reddish-brown. In either case it may contain musty and moldy spots.

Hay that is baled from the windrow usually goes through a sweat in the bale. If such hay is graded when the hay is heating, which is a stage of the sweating process, it would be graded Sample grade (HIM 106). If such hay is graded after it has passed through the sweat and the fermentation caused the hay to "set" a little but not to mold the fermentation would not affect the grade except in the reduction of the amount of green color. However, a distinctly fermented, caked, or moldy condition places the hay in Sample grade without regard to its other factors (HIM 108 and 109).

99 EVIDENCES OF WEATHER DAMAGE:- Appraising the extent of weather damage is more difficult than appraising the stage of maturity. Slight damage and loss of color usually arise from dews, fogs, or light summer showers followed by sun bleaching while moisture is on the hay or when the ground is damp at the time the hay is cut. The evidence of such slight damage is found in yellow or straw colored bleaches on portions of the stems, or in leaf discolorations here and there in the hay. Severe weather damage and extensive loss of color are caused commonly by heavy rains or numerous showers when hay is in the swath, windrow, bunch or cock. Hay stacked outdoors in small or flat stacks that do not shed water properly is often severely damaged by rains. The evidence of severe weather damage in hay is found in the dark brown or faded brown colors, or stains, that take the place of the bright, fresh, green and yellow-green colors of undamaged or slightly damaged hay. Sometimes inspectors confuse stack or mow sweated alfalfa or clover (so-called tobacco-brown hay) with dark brown weathered hay. Such strongly sweated hay, however, which may be recognized by its pungent odor, has much more feed value than weathered hay (HIM 152).

100 EFFECT OF DISCOLORATIONS ON GRADE BY COLOR:- The color specifications in United States hay standards have been devised in such a manner that the No. 1 grades will permit small amounts of bleach and shower damage, or the grey-green color of slight fermentation, providing the hay was cut at the proper time and properly cured. When the bleaches and discolorations are distinctly noticeable and uniformly distributed throughout the sample the hay cannot meet the color requirements of the No. 1 grades, and the character and extent of the discolorations determine whether the hay has retained a sufficient percentage of green color for the No. 2 grade or whether the damage was so severe as to place the hay in the No. 3 grade on account of its color. The effect of various amounts of yellow, brown and reddish-brown discolorations, and of the grey-green color arising from fermentation, upon the percentage of green color in hay, and therefore upon the grade, is discussed in detail in items 139, 140, 141, 150, 164, 169 and 174 of this manual.

CHAPTER 22 - SAMPLE GRADE

101 EXPLANATION OF SAMPLE GRADE:- Sample grade hay under the United States standards may be either sound or unsound depending upon the factor which places it in Sample grade. Occasionally inspectors who have worked under other standards than United States standards interpret U. S. Sample grade as being a grade to include only unsound hay. This latter interpretation is incorrect, as Sample grade in United States standards is intended to include also hay of distinctly low feeding quality and hay containing excessive amounts of foreign material. Reasons for Sample grade accompany the standards for each group of hay and are not uniform because special problems are found in some groups that are not found in others.

102 GRADE DESIGNATIONS FOR SAMPLE GRADE:- The Sample grade designation shall always be followed by the specific reason for assigning the grade. This system of adding a remark to Sample grade designations which describes the reasons for placing the hay in Sample grade permits buyer and seller to know either whether the hay is sound or unsound, or that the hay is of very low quality because of maturity, severe weathering or stain, or otherwise not having the quality of any one of the numerical grades. The writing of such statements under "Remarks" is obligatory on the part of the inspector (HIM 137). Explanations of reasons for Sample grade and illustrations of statements and "Remarks" are given in the succeeding items.

103 FOREIGN MATERIAL AND INJURIOUS FOREIGN MATERIAL:- Alfalfa and Alfalfa Mixed Hay; Grain, Wild Oat, Vetch, and Grain Mixed Hay; and certain types of Mixed Hay which have over 15 percent foreign material, and all other kinds of hay which have over 20 percent foreign material, but which do not have over 35 percent foreign material, are graded Sample grade. Also any kind of hay which has more than a trace of injurious foreign material shall be graded Sample grade. The grade designations for all hay which is so graded on account of foreign material or injurious foreign material shall be followed by a statement under "Remarks" of the words "foreign material" or "injurious foreign material" as the case may be (HIM 114).

Class and grade	Remarks
U. S. Sample grade Clover	Foreign material
U. S. Sample grade Alfalfa	Injurious foreign material

104 OBJECTIONABLE ODORS:- Objectionable odors in hay are those arising from skunk odor, foul weeds such as rag-weed, garlic or wild onion, and those odors absorbed from external sources such as are found in cars which previously contained fertilizer or creosote. Whether an odor is actually objectionable or not must be left largely to the good judgment of the inspector and to the local experience of livestock feeders. In general if the odor is slight it should not be considered but if pronounced the hay should be placed in Sample grade. When hay is graded Sample grade because of an objectionable odor a statement under "Remarks" must follow the grade designation (HIM 137) in which the name of the odor is given, if possible, as follows:

Class and grade	Remarks
U. S. Sample grade Timothy	Fertilizer odor
U. S. Sample grade Clover	Garlic odor
U. S. Sample grade Alfalfa	Objectionable odor

105 UNDERCURED:- For inspection purposes, undercured hay may be defined as newly harvested hay which is sappy and tough but which is not heating or hot at the time of inspection (HIM 106). This type of hay is found usually on the market during the summer and early autumn months when much windrow baled hay is loaded directly from the field. Newly harvested and undercured hay that is so sappy as to necessitate certification as "Undercured" may be recognized by its comparative softness and toughness, its aroma, its shiny or glossy green color, and its clinging foliage. Another method of recognizing undercured alfalfa hay is the ease with which the epidermis or outer bark of the stem can be peeled or scraped off with the thumb nail. In well cured hay this outer bark will not separate from the inner portion of the stem. Undercured Johnson hay can be detected by examining the nodes on the stalks. If the hay is not thoroughly cured moisture can be found at the nodes when the stems are twisted.

A degree of toughness is noticeable, in some climates, especially in alfalfa, that should not be confused with undercured hay. This slightly tough hay is caused by the exposure of well-cured hay in bales, to fogs, or to air of great humidity for many hours. Such hay is by no means undercured nor in danger of heating and molding and should be graded under straight numerical grades.

In all cases where hay is tough and damp throughout from undercuring though not heating, it is in a condition where fermentation is liable to develop. Such hay, therefore, is graded as Sample grade with the statement of the word "Undercured" under "Remarks" (HIM 137).

Examples of grade designations and remarks for undercured hay are given as follows:

Class and grade	Remarks
U. S. Sample grade Green Extra Leafy Alfalfa	Undercured
U. S. Sample grade Green Clover	Undercured

106 HEATING AND HOT HAY:- When high temperatures develop in hay from the processes of fermentation (HIM 98), such hay is called "heating" or "hot" for the purposes of the standards. Care should be taken never to confuse hay that is heating or hot from fermentation with well cured hay that is very warm due to storage in metal cars or sheds during a period of hot weather. Heating or hot hay in railroad cars is usually indicated by moisture on the ceiling of the car which is never present when the hay is only warm from the heat of the sun. Heating or hot hay usually gives off a strong, sour odor that indicates fermentation at some place in the carlot. Occasionally the plug taken from a car of heating hay does not have this odor because the bales have been exposed to the air. Any suspicion of heating can be confirmed, however, by examining bales that have not been disturbed in the plugging operation. If the temperature is high and the hay is sweating but could probably be saved if given proper ventilation, it is called "heating". If the hay is so hot that fermentation has caused sourness and partial decomposition it is called "hot".

When a material portion of a lot of hay is found to be heating or hot and the remainder is of the same type as the part that is out of condition, the entire lot should be graded Sample grade. Under these conditions no inspector can determine

definitely the number of bales that are sound because many bales that appear sound and cool on the outside may be out of condition at the core and are in the early stages of fermentation. Therefore, it is advisable to grade the entire lot as Sample grade rather than to attempt to determine the quantity of Sample grade hay and the quantity of sound hay.

When the lot of hay consists of two or more distinctly different types, cuttings, and/or grades (HIM 85), and when one portion of the lot is heating or hot and the other portion sound and cool, the entire lot should not be graded Sample grade but each portion should be graded according to its quality and condition, and the certificate must show the percent or number of bales of each portion and the respective grade designations.

Statements under "Remarks" with reference to heating and hot hay are written as follows:

Class and grade	Remarks
U. S. Sample grade Alfalfa	Heating
U. S. Sample grade Alfalfa	Hot
60% U. S. No. 1 Alfalfa Light Grass Mixed	
40% U. S. Sample grade Leafy Alfalfa Light Grass Mixed	Heating
100 bales U. S. No. 2 Johnson	
50 bales U. S. Sample grade Johnson	Hot

107 WET HAY:- For inspection purposes wet hay may be defined as hay containing an excess of moisture derived from external sources such as rain and snow. Rain damaged hay that is baled before it is dry enough, or hay that is rained or snowed upon during the baling process or during the period of hauling and loading on cars are the chief causes for wet hay. In some instances baled hay may become wet from rains or snows while in the field or shed piles, in cars with doors left open, or in cars with leaky roofs, doors, and sides. When hay is baled from stacks in rainy climates some of the bales may be of wet hay taken from spots in the stacks where snow or rain has penetrated deeply.

The inspection and certification of wet hay requires inspectors to pass judgment on the character and extent of the damage and to decide whether the hay is only wet on the outside or whether the damage has permanently affected the condition and grade of the hay. The character and extent of the wetness or dampness in hay bales may be determined by thrusting the hand between the bales or between the flakes in a bale, to determine by the sense of touch whether the dampness permeates the entire bale or is confined merely to the outside of the bale. A hay hook may be pushed in between the flakes also as a means for drawing out samples for examination. Well cured hay that has been rained or snowed upon, and that is "wet hay" for inspection purposes, may be distinguished from undercured hay by its lack of freshness and aroma, its relative harshness and the presence of some shattered leaves, heads and stems caused by handling.

No definite moisture tests for hay can be applied as with grain which will determine hay that is susceptible of reconditioning, or hay that is permanently out

of condition from external moisture. The only guides are common sense and experience employed under the general instructions of this item.

Occasionally hay becomes wet in transit from leaky car roofs, doors, or sides. When the evidence is plain that a leaky car is responsible for "wet hay" a statement should be written in the certificate at the bottom of the space provided for "Grade and class," for example: "Car has a leaky roof at brake end."

Lots of hay baled from stacks in which there are damp spots, or lots of hay from piles in fields, sometimes contain many dry bales and a few wet or damp bales. Inspectors are prone to certificate all such hay under numerical grades and then to try to add a safeguarding statement "some damp bales." This practice is not permissible under these instructions for applying the U. S. hay standards. If a few bales are noticeably wet they should be tallied and graded as straight Sample grade with the statement of the word "Wet" under "Remarks". In this case the certificate must be split to show the portion of the lot that is Sample grade. In instances of this character, when at shipping points, inspectors should try to influence shippers to cull out the damp bales from the dry bales and not to load them.

Examples of grade designations and statements under "Remarks" for wet hay are given as follows:

Class and grade	Remarks
U. S. Sample grade Timothy	Wet
U. S. Sample grade Green Alfalfa	Wet
80% U. S. No. 2 Johnson	
20% U. S. Sample grade Johnson	Wet and musty
*Car has a leaky roof at brake end.	

*To be written at the bottom of the space provided for "Grade and class" in the certificate.

108 MUSTY OR MOLDY HAY:- Must and mold are usually associated together in hay that has heated and fermented or in hay that was severely rained upon when newly cut and not cured before molding set in. Must is the fetid, sour odor usually accompanying moldiness and is evidence of a damaged condition in the hay even though the mold itself is not visible. Mold is a fungus plant organism that develops in hay when moisture and temperature conditions are favorable. Usually the heat and mold decompose some of the hay and give it a dark brown or black color, but white, powdery molds are found also in the so-called "stack spots" common in alfalfa stacks where rain or snow has settled into the hollow places in the stacks.

The brown and black molds are easy to detect in their advanced stages both from the appearance of the hay and its strong, musty odor. The white molds of "stack spots," however, are not so easy to observe because in most instances the hay containing such molds is sweated and low in natural green color, and thus the mold blends with the color of the hay. Any suspicion of white mold in hay may be checked by the white, dusty substance that is present in bales pressed from hay containing "stack spots." A few wisps of hay pulled out of the bales with a hay hook will usually

reveal the white mold if it is present.

Inspectors are sometimes in doubt as to when a bale, or a number of bales, contain enough musty or moldy hay to justify the use of Sample grade. When flakes of moldy or musty hay are mixed in any quantity with sound appearing hay there is no question about the sample grade character of the bale.

Whenever hay bales show indications of being musty or moldy, and the inspector is in doubt about the extent of the damage he should break open a bale or two to obtain all evidence possible prior to grading the lot (HIM 45). Numerous lots of hay are marketed which have been baled from the windrows while the hay was undercured and which subsequently became musty or moldy. Other lots are found which have been baled from stacks containing musty or moldy hay due to "stack spot". Often such musty or moldy hay is mixed with sound hay in the bales, or is in the core of the bales so that it is difficult to determine which bales contain unsound hay and which ones do not. When a distinct evidence of these forms of damage is found in a lot of hay that is uniform in type, the entire lot should be graded Sample grade.

When the lot of hay consists of two or more distinctly different types, cuttings, and/or grades (HIM 85), and when one portion of the lot is musty or moldy and the other portion sound and sweet, the entire lot should not be graded Sample grade but each portion should be graded according to its quality and condition and the certificate must show the percent or number of bales of each portion and the respective grade designations.

The statements under "Remarks" (HIM 137) on the certificate for musty or moldy hay are written as follows:

Class and grade	Remarks
U. S. Sample grade Johnson	Moldy
U. S. Sample grade Upland Prairie	Musty
70% U. S. No. 2 Leafy Alfalfa	
30% U. S. Sample grade Leafy Alfalfa	Moldy

109 CAKED HAY:- Caked refers to the solidified condition of baled hay and such hay is usually musty or moldy. Caking is caused by sweating, heating, and the development of mold organisms in bales of wet or undercured hay. The term "set" is used in some regions in place of "caked" and in other regions it is used to describe hay that is very tightly compressed or that was baled from the windrow or stack in a slightly tough condition. Because of the various meanings of the term "set" inspectors are advised not to use it in describing hay. In the majority of cases hay bales that are caked, either completely or partly, and which have loose and rusty wires, are musty and moldy in the center of the bale.

Hay that has been windrow baled usually sweats in the bale and must and mold are likely to develop, especially in the interior of the bales if the sweat occurs in an unventilated place such as a railway car or warehouse. Bales of windrow baled alfalfa and Johnson hay, especially, are common that appear sound and green on the outside but which are moldy on the inside. Sometimes, however, bales that appear

hard and slightly caked are not unsound but are either tightly compressed or hard from a degree of bale sweating or fermentation that has solidified the hay but that did not cause mustiness and moldiness. Such hay should not be graded Sample grade but should be assigned a numerical grade. When suspicion is aroused by odor, slight caking, or loose wires, the inspector can check up on the interior condition of bales by pushing a hay hook into a bale and drawing out a wisp of hay. In all cases where the condition of hay is in question a bale or two should be broken before the grade is finally determined and certified (HIM 45).

In most cases distinct evidence of caked bales in a lot of hay should cause the entire lot to be graded Sample grade. (See instructions re musty or moldy hay HIM 108).

The statements under "Remarks" (HIM 137) on the certificate for caked hay are written as follows:

Class and grade	Remarks
U. S. Sample grade Timothy	Caked

110 BADLY BROKEN hay is hay that has been broken in short pieces in the baling operation or hay picked up around the baler and which consists principally of chaffy material and pieces not over 6 inches long.

111 BADLY STAINED, BADLY WEATHERED AND BADLY OVERRIPE are Sample grade specifications which refer to hay that has very little feed value. BADLY STAINED hay is often musty or moldy and a severe degree of stain should be considered as an index to an unsound condition (HIM 127). BADLY WEATHERED hay has very little or no green color or brightness but has a dull, dead color and is always of low palatability and feed value due to its loss of nutrients through weathering (HIM 126). BADLY OVERRIPE hay is hay that became either very brown or woody before cutting or hay that has plump, filled seeds, irrespective of the color. In either case the palatability and feed value are very low (HIM 125). Inspectors are cautioned that U. S. No. 3 grade is intended to include hay that has an appreciable, though relatively low, degree of palatability and feed value and therefore, stain, weathering and overripeness must be very distinct to justify the use of Sample grade.

The statements under "Remarks" (HIM 137) on the certificate for badly broken, badly stained, badly weathered or badly overripe hay are written as follows:

Class and grade	Remarks
U. S. Sample grade Alfalfa	Badly weathered
U. S. Sample grade Timothy	Badly overripe
U. S. Sample grade Timothy	Badly stained
U. S. Sample grade Timothy	Badly broken

112 VERY DUSTY HAY:- Hay that is full of dust or dirt of one kind or another is also placed in Sample grade. Hay which is cut from meadows that were flooded with water containing large quantities of silt either before or after it was cut

usually will contain sufficient dust to be considered as very dusty. Also hay produced along dusty roads may contain sufficient dust to be considered very dusty.

The statements under "Remarks" (HIM 137) on the certificate for very dusty hay are written as follows:

Class and grade	Remarks
U. S. Sample grade Red Oat Hay	Very dusty

113 **DISTINCTLY LOW QUALITY:-** Most lots of very low quality hay may be graded Sample grade because of one or more specific reasons for Sample grade, such as musty, moldy, badly weathered, badly overripe, or badly stained.

Occasional lots of very low quality hay may be found, the causes for which are not included in the specific reasons for Sample grade. Unforeseen factors of low quality may be found at times which would justify the grade of Sample grade account distinctly low quality.

The statements under "Remarks" (HIM 137) on the certificate for distinctly low quality hay are written as follows:

Class and grade	Remarks
U. S. Sample grade Timothy	Distinctly low quality

CHAPTER 23 - FOREIGN MATERIAL

114 **DEFINITIONS FOR "FOREIGN MATERIAL" AND "INJURIOUS FOREIGN MATERIAL"** and also definitions for the basis of foreign material percentages are given in the Handbook of Official Standards. Special problems in regard to "foreign material" and "injurious foreign material" are discussed in succeeding items.

115 **FOREIGN MATERIAL NOT CONSIDERED IN HAY CLASSING:-** Foreign material is not a factor in the determination of the class of hay. The mixture requirements of the various classes of hay are based upon percentages by weight of the total hay (including foreign material). The following illustration shows how the mixture specifications are interpreted in determining the class. In the hay classes Timothy Light Clover Mixed and Timothy Medium Clover Mixed, clover is the one factor that determines the class. The class Timothy Medium Clover Mixed is defined as a mixture of timothy and clover with over 30% but not over 50% clover. That means that the total amount of pure clover must be within these amounts and that the remainder of the hay must be timothy (including its grass tolerance) except for such foreign material as is in the bale. The foreign material is not computed as either a part of the clover

or the timothy but merely as a portion of the remainder after the deciding factor of clover has been computed on a purity basis.

116 "FOREIGN MATERIAL" AS A GRADING FACTOR:- The amount of foreign material present directly affects the grade of the hay. Hay must be graded according to the amount of foreign material, irrespective of other grading factors, when the amount of foreign material is such as to require a lower grade than the grade due to all other factors.

Optional statements under "Remarks" describing the kind of foreign material, such as rakings, thistles, briars, stubble, etc., may be placed in the certificate (HIM 138).

Optional statements under "Remarks" with reference to foreign material are written as follows:

Class and grade	Remarks
U. S. No. 3 Clover	Foreign Material (mostly Canada thistles.)

117 NON-INJURIOUS FOREIGN MATERIAL:- This term is used to describe all kinds of matter in hay that is commonly wasted in feeding operations but that is not considered harmful to livestock if eaten. Several typical kinds of non-injurious foreign material are described herewith. STUBBLE includes the dead stems of small grain crops of preceding years also the dead stems and leaves of preceding hay or seed crops. CHAFF (HIM 110) is small pieces of broken stems, broken leaves, seeds, clover flowers and similar matter which accumulates at the bottom of stacks, mows and around balers when at work. Some of this occurs naturally on the lower side of every bale pressed and in such cases no attention should be paid to it if the amount is not excessive. Sometimes, however, a considerable quantity is gathered up by balers and placed in one or several bales. In such cases chaff should be considered as badly broken hay and graded accordingly (HIM 110). WEEDS SUCH AS CANADA THISTLE, other kinds of thistles, briars, and other weeds of a similar nature are considered as non-injurious foreign material unless they are difficult for animals to separate from hay and when eaten are known to injure and lacerate their mouths (HIM 123). Ordinarily stock will not eat thistles and similar weeds in hay and such foreign material merely becomes waste in the feed mangers.

Other non-injurious foreign material includes sticks, stones, dirt, and other matter of no feeding value which occurs naturally in the hay. If the inspector has cause to believe, either on account of the large amount present or for any other reason, that such matter did not occur naturally but was baled with the hay to perpetuate a fraud it indicates a violation of the Food, Drug and Cosmetic Act and should be reported (HIM 12).

118 COARSE SWEET CLOVER should be included as foreign material because the coarse stalks are waste in the feed manger. The definitions for "hay" accompanying each group of standards exclude coarse or overripe sweet clover under the general phrase "which has recognized feeding value and which is not coarse and woody". Sweet

clover that is not cut until the alfalfa or prairie grasses are cut, with which it is often found, will be very coarse usually, as well as lacking in leaves. The smaller branches near the top of old sweet clover plants may not be very large in diameter but they are woody and of very little or no feeding value and should be considered as foreign material the same as the coarse stalk butts. Inspectors are cautioned not to lower the grade of alfalfa or other kind of hay on account of sweet clover on the suspicion of the presence of sweet clover that comes from its pungent odor. The hay must be examined carefully to support the suspicion caused by the sweet clover odor and to determine whether any sweet clover that is present is coarse or overripe. When woody sweet clover is detected in hay in amounts sufficient to cause the hay to be graded downward, an optional statement under "Remarks" in the certificate following the grade designation may state that the foreign material is sweet clover (HIM 138), as follows:

Class and grade

Remarks

U. S. No. 3 Green Alfalfa

Foreign material (woody sweet clover)

119 VERY COARSE AND WOODY ALFALFA STEMS when occurring in hay other than in Alfalfa and Alfalfa Mixed Hay should be considered as foreign material in case they have become so coarse and woody that they have little feeding value. Old woody stems of alfalfa are always caused by very late cutting and may be recognized by their hard woody nature, the spotted colors, the lack of leaves and the presence of mature seed. This type of alfalfa is sometimes found in mixtures with timothy or Johnson, indicating that the time of cutting the alfalfa was delayed several weeks too long or until the timothy or Johnson had reached the proper stage of maturity and the alfalfa had passed far beyond it.

Optional statements under "Remarks" about very woody alfalfa as foreign material may be written in certificates (HIM 138) as follows:

Class and grade

Remarks

U. S. No. 3 Timothy

Foreign material (old and very woody alfalfa stems.)

120 WIRE GRASSES are sometimes called "dog hair" by the trade and are considered as foreign material. These grasses are found most commonly in prairie, Johnson and alfalfa hay, and are the types of grasses that are found in the low wet spots in the meadows where the hay plants have died out because of excessive moisture. They have little or no feed value and they detract from the appearance and sale value of the hay. They are more noticeable in alfalfa than in either prairie or Johnson but can be recognized in all classes of hay by the fine, wiry appearance and harsh texture. No cured wire grasses show the distinct leaf and stem character of such hay plants as bluestem, bluegrass, sporobolus or dropseed grasses, and Bermuda grass. Wire grass will twist into a tough strand like rope whereas other grasses will break in the twist.

Optional statements under "Remarks" about wire grass as foreign material may be written in certificates (HIM 138) as follows:

U. S. No. 3 Johnson

Foreign material (wire grass)

121 STRAW:- Straw for inspection purposes as foreign material under the U. S. standards is the stems of the small grains after the grain has been threshed or otherwise removed from the heads also badly overripe grain hay. When more than 35 per cent of straw is mixed with hay the commodity is not classified under the standards but it may be described on certificates (HIM 189).

Optional statements under "Remarks" about straw as foreign material may be written in certificates (HIM 138) as follows:

Class and grade

Remarks

U. S. No. 2 Alfalfa

Foreign material (grain straw)

122 MATURED GRASSES:- Pigeon grass, wild brome grasses such as cheat, and broom sedge are considered as foreign material when mature and as grasses when early cut. These grasses when they are ripe have very little feeding value and give the hay a bad appearance.

Optional statements under "Remarks" about matured grasses as foreign material may be written in certificates (HIM 138) as follows:

Class and grade

Remarks

U. S. No. 3 Alfalfa

Foreign material (ripe pigeon grass)

123 INJURIOUS FOREIGN MATERIAL:- Any material is considered injurious if livestock cannot easily separate it from the hay and if eaten injures the animals. The standards require "more than a trace" of injurious foreign material as a cause for Sample grade. More than a trace implies a sufficient quantity to be injurious in fact to livestock and inspectors should not grade hay as Sample grade on the basis of a very few scattering plants or burs of injurious character.

Wild barley or squirreltail grass is the most common injurious foreign material found in hay. It is common in many alfalfa meadows which have wet spots and thin stands. Broncho grass is a type of injurious foreign material common in the grain and grass hays of the Western States. Mature Stipa with the needles attached and certain mature Aristidas with sharp pointed callus at the base of the seeds are occasionally found in prairie hay. When in this condition Stipa and certain species of Aristida are considered harsh bearded grasses injurious to the mouths of animals and should be considered as injurious foreign material. Stipa, when in the vegetative stage, is considered a very good forage plant and some upland prairie hay is produced which is made up almost entirely of immature Stipa grasses. Aristida, when in the vegetative stage, is known as wire grass because it is wiry, stringy and harsh and is, therefore, considered as foreign material (HIM 120). Sand burs and puncture vine burs are injurious foreign material occasionally found in alfalfa hay produced on sandy soils or in dry climates. Any other plants having stiff, harsh beards or spines that livestock will eat and that are known to lacerate their mouths, and plants that are known to be poisonous should be considered as injurious foreign material.

Optional statements under "Remarks" describing the kind and character of injurious foreign material may be written in certificates (HIM 138) as follows:

Class and grade	Remarks
U. S. Sample grade Alfalfa	Injurious foreign material (squirreltail grass)
U. S. Sample grade Leafy Alfalfa	Injurious foreign material (broncho grass)

CHAPTER 24 - UNUSUAL PROBLEMS IN HAY GRADING

124 TOLERANCES OF GRAIN HAY:- The definition for grasses permits a tolerance of 10 percent of grain hay. This substitution of grain hay (10 percent or less) for grasses applies either with or without the presence of true grasses in the mixture. For example: a mixture of 80 percent clover, 10 percent wild oat hay, and 10 percent foreign material is classed as Clover, - the 10 percent of wild oat hay being considered as grasses in the mixture. Similarly a mixture of 70 percent clover, 10 percent bluegrass, 10 percent wild cat hay and 10 percent foreign material is classed as Clover, - the 10 percent of wild oat hay being considered as a portion of the total grass tolerance permitted in the class Clover.

In the standards for Group I - Alfalfa and Alfalfa Mixed Hay, the maximum grass tolerance in the class Alfalfa is 5 percent and larger amounts of the grasses place the hay in the classes Alfalfa Light Grass Mixed or Alfalfa Heavy Grass Mixed. Grain hay may substitute as a grass for the maximum of 5 percent grasses permitted in the class Alfalfa. Then in all other classes except Alfalfa Light Grain Mixed and Alfalfa Heavy Grain Mixed, it may be permitted as a substitute for grasses in amounts of not over 10 percent. In mixtures consisting of alfalfa and grain hay the presence of over 5 percent of grain hay and over 10 percent of alfalfa places the hay in either the class Alfalfa Light Grain Mixed, or Alfalfa Heavy Grain Mixed, in the Alfalfa and Alfalfa Mixed Hay standards or Oat Light Alfalfa Mixed, Wheat Light Alfalfa Mixed or Barley Light Alfalfa Mixed, in the Grain, Wild Oat, Vetch and Grain Mixed Hay standards according to the amount of grain hay and alfalfa. In these three classes a tolerance of grasses (10 percent or less) is permitted as a part of the grain hay.

In all classes in Groups I, II, III, IV, VI, and VII, except Alfalfa Light Grain Mixed and Alfalfa Heavy Grain Mixed, the presence of more than 10 percent of grain hay is not tolerated. Greater amounts of grain hay (over 10 percent) place the mixtures in either Group V-Grain, Wild Oat, Vetch, and Grain Mixed Hay, or Group IX-Mixed Hay, depending on the mixtures of other hays present.

A tolerance of grain hay, with other grasses is an unusual matter in hay inspection work and when it occurs inspectors may write an optional statement under "Remarks" in the certificate (HIM 138) as follows:

Class and grade

Remarks

U. S. No. 2 Alfalfa Light Grass Mixed

Grasses are crabgrasses
and early cut wild oats.

125 OVERRIPE AND BADLY OVERRIPE HAY refers to hay that was cut when the plants were mature or nearly so. Hay of this character has low feed value because the nutrients have been transported from the stems and leaves to other parts of the plant and the stems have become very woody. Evidence of OVERRIPE hay (HIM 87) is seen in the brown colors caused by natural curing prior to cutting and in the nearly matured seeds, and in case of timothy by the shattered heads. Hay that is graded No. 3 on account of color and/or leafiness and which is also OVERRIPE may be so described (HIM 138), by the optional remark "Overripe" in certificates. This statement should not be used in connection with the No. 2 grades. BADLY OVERRIPE hay (HIM 87) as indicated principally by plump, filled seeds, should be graded Sample grade and the term "Badly overripe" must be added as the reason for Sample grade (HIM 137).

Statements under "Remarks" about overripeness are written in certificates as follows:

Class and grade

Remarks

U. S. No. 3 Timothy

Overripe

U. S. No. 3 Alfalfa

Overripe

U. S. Sample grade Alfalfa

Badly overripe

126 WEATHERED AND BADLY WEATHERED HAY (HIM 99) refers to hay that has been exposed to the elements until it has lost its aroma and much or all of its green color, thus causing a severe loss in palatability and feed value. Several heavy showers, or numerous light showers accompanied by dews and sun bleaches, when the hay is in the swath, windrow or cock, leach the nutrients from the plants and leaves the hay with very little or no green color. Heavy rains upon unprotected stacks improperly built to shed water will cause weathered hay on the outside of the stacks as well as to cause interior damage known as "stack spot". WEATHERED hay which has a trace of green color should be graded No. 3 and the term "Weathered" may be placed in the certificate (HIM 138), as an optional remark. BADLY WEATHERED hay which usually has no green color is graded Sample grade and the term "Badly weathered" is added to the grade designation as a reason for the Sample grade (HIM 111 and 137). Such statements under "Remarks" are written as follows:

Class and grade

Remarks

U. S. No. 3 Clover

Weathered

U. S. Sample grade Alfalfa

Badly weathered

127 STAINED AND BADLY STAINED HAY refers to hay that has an unnatural, dark, green-yellow color that is distinctly different from either the natural green color of properly cured hay, the bright yellow or yellow-green color of bleached hay,

or the dull and completely faded color of badly weathered hay. The discolorations in so-called "stained hay" are caused often in hay mows by the absorption of ammonia-laden moisture from warm stables. In the field, stain discolorations arise from the absorption of impure water in the bottoms of hay cocks, windrows, bunches, or stacks. When partly cured hay gets soggy from rain and does not dry out for many days because of damp atmospheric conditions it will sometimes discolor and stain rather than to merely fade and lose its natural green color. Hay that is distinctly stained throughout is very unpalatable and often unsound.

Stain is sometimes confined to a few wisps of hay in a bale and at other times one-fourth, one-half or nearly all of the bale is of stained hay. When only a few wisps are stained and the remainder of the bale has natural, bright color, the stain may be disregarded in determining the grade,

In Groups II, III, and VIII, the grade requirements provide that "Hay that is stained shall not be graded Extra Green, Green, No. 1, or No. 2. (Pages 15, 17, and 32 of the Handbook of Standards). In most cases of stained hay the damage which caused the stain was sufficient to reduce the percent of green color down to the specifications for the No. 3 grade. Occasionally the Department methods for measuring color reveal samples of stained hay that analyze 30 to 40 percent green color. For this reason a provision is made in the grade requirements that stained hay shall not be graded higher than No. 3. This grade requirement is not intended to apply to hay that shows but small traces of stain, or which contains a few scattering stained wisps but rather to hay that plainly indicates a stained condition. Observations made on this matter indicate that when one-tenth to one-fifth of the hay is plainly stained a more or less general condition of stain will be found in the lot that requires the use of the grade requirement for stained hay. In smaller volume stain in itself is not necessarily a grading factor although it may affect the percent of green color.

Stained hay is most commonly found in timothy, Johnson Hay, grass hay, and grain hay, although it is sometimes found in prairie hay. Inspectors are cautioned to investigate stained or partly stained lots of hay very carefully for evidence of mold or must that would put such hay into Sample grade. Stain, in timothy and Johnson especially, is quite often an index to unsoundness inside the bales. This matter is of special importance in Johnson hay because stain is so common in this hay that it is not used as a special factor to determine the grade unless the hay is badly stained.

When hay that is sound but partly stained is graded No. 3 the word "stained" shall be placed in the certificate under the space provided for "Remarks". It is not necessary to ever use the word "stained" in connection with the small amount of stain that might be found in the No. 2 grade. If the hay is badly stained and the stain uniformly spread through the bale the quality of the hay is distinctly low, whether sound or unsound, and the hay should be graded Sample grade and the words "Badly stained" should be added to the grade designation (HIM 137).

Statements under "Remarks" with respect to stained hay are written in certificates as follows:

Class and grade	Remarks
U. S. No. 3 Timothy	Stained
U. S. Sample grade Johnson	Badly stained

128 SWEATED HAY refers to hay that has fermented or heated (HIM 98) slightly but in which the heat was not sufficient to cause the hay to become musty or moldy. There are two distinct types of sweated hay, namely; bale sweated and stack or mow sweated. Hay that is baled directly from the widow or cock usually goes through a sweat in the bale. If this sweating in the bale is very light it will not affect the color or quality of the hay, but if it is moderately continued it will reduce the color inside the bale, and give the hay a fermented odor. Stack or mow sweated hay has a grey-green color and no fermented odor if the sweat was light; a light brown color and a slight fermented odor if the sweat was moderate; and a dark brown or black color with a strong fermented or charred odor if the fermentation was excessive (HIM 152). Bales of bale sweated hay are often green on the outside, grey or greenish-brown on the inside and slightly "set". Bales of stack or mow sweated hay have a more uniform color throughout and are not solidified from the sweating. Sometimes bales of bale sweated hay contain interior unsound spots (HIM 109). Some buyers and feeders have a preference for sound, sweated hay and inspectors may write an optional statement under "Remarks" about the sweated condition in the certificate (HIM 138) as follows:

Class and grade	Remarks
U. S. No. 2 Leafy Alfalfa	Sweated

129 MOWBURNT HAY is a trade term which refers especially to timothy and clover that has heated and fermented strongly in hay mows. Such hay loses the bright color and sweet aroma of well cured and mildly sweated hay and becomes brown and dull in color with a sour or slightly musty odor. Mowburnt hay is usually musty or moldy. In markets where dealers and buyers consider a statement of this condition of significance in hay marketing an optional statement under "Remarks" may be written in the certificate (HIM 138) as follows:

Class and grade	Remarks
U. S. Sample grade Timothy	Musty (Mowburnt)

130 DESCRIPTION OF GRASSES IN CLASSES OTHER THAN GRASS HAY:- In Group VIII, Grass Hay, a description of the Grasses by common name or local trade name is required as a part of the regular grade designation. No such provision is required, however, for naming the grasses in other hay classes where the grasses comprise a portion of the mixture. Occasions may arise in inspection work in connection with such hay classes as Timothy Heavy Grass Mixed, Alfalfa Heavy Grass Mixed or Johnson Heavy Grass Mixed, when applicants would prefer to have the grasses in the mixture named (HIM 138).

Optional statements under "Remarks" about grasses may be written in certificates under such conditions, as follows:

Class and grade	Remarks
U. S. No. 1 Timothy Heavy Grass Mixed	Grasses are blue-grass and redtop.
U. S. No. 2 Alfalfa Heavy Grass Mixed	Grass is early cut cheat
U. S. No. 2 Johnson Heavy Grass Mixed	Grass is Paspalum
U. S. No. 2 Timothy Light Grass Mixed	Grass is mature bluegrass.

131 BLEACH ON OUTSIDE OF BALES:- When baled hay is piled in the fields or in warehouses where it is exposed to sunlight a white bleach develops that is commonly called "pile" or "house bleach". Such bleach is usually shallow on the affected bales and easily recognized from field bleach (HIM 97) which develops on many wisps of hay in windrows and cocks and which is scattered and woven into the bales during baling. Pile or house bleach may be disregarded in grading a lot of hay if it is seen that such bleach is confined to the ends and sides of a few bales on the outside of the pile, and that the hay inside the bales is unaffected. In small piles so many bales may be bleached as to necessitate a consideration of the outside bleach in its effect on the color of the entire lot but ordinarily pile bleach is confined to only a small percentage of the total bales in the lot. Inspectors should always cut into a number of pile bleached bales to examine the color of the hay in the interior of the bale.

132 CHARACTER OF BALING:- When hay is poorly baled a statement to that effect must be written in certificates (Page 62 Handbook of Standards).

In certain markets the character of the baling whether loose or tight is of importance in merchandising the hay. For example, rabbit feeders prefer loose baling to tight baling and pay premiums for the loosely baled alfalfa. In some markets, the size and weight of the bales are items of importance in the sale of the hay and premiums are given for the type of bale preferred.

Statements about the character of the baling should be written in certificates (HIM 65) at the bottom of the space provided for "Grade and class" to show that the statement applies to the entire lot as follows:

Class and grade	
U. S. No. 2 Upland Prairie	*Ragged bales with many loose wires.
U. S. No. 1 Extra Leafy Alfalfa	*Loosely baled in neat bales.
U. S. No. 2 Timothy	*Large, 5 wire bales.
*To be written at the bottom of the space provided for "Grade and class".	

CHAPTER 25 - STEEL WIRE GAGE SPECIFICATIONS

133 There are a number of gages that are spoken of as wire gages and which are used to measure the diameters of various kinds of wire. The gages that are in most common use are the steel wire gage, Birmingham gage, and copper wire gage. The gage referred to in the official hay standards of the United States is the steel wire

gage, or W. & M. wire gage No. 287. In the following table the diameters of the various sizes of steel wire are compared to the diameters of the various sizes of common nails so that the inspector who has no steel wire gage will have something to use as a standard for the determination of texture in the various kinds of hay where texture is a grading factor.

Steel wire standards

Common nail sizes

No. 14	3 penny fine (Shingle)
" 12	4 penny (Lath)
" 11	6 penny (Box)
" 10	8 penny
" 9	10 penny

Texture determinations for hay plants are made by measuring the diameters of the stalks about two inches above the point at which the plant was cut by the mower. Care should be taken to get plants that show the cut surface.

CHAPTER 26 - GRADING "LINER" LOTS OF HAY

134 One of the most difficult problems that an inspector has to contend with is that of making a grade decision for a lot of hay which is near the dividing lines between two grades. One method used by some inspectors when they are in doubt is to decide in favor of the shipper. This is a bad practice and should never be done because the shipper has no more right to the benefit of the doubt than the buyer.

The best method to use in the solution of problems of this kind is to study the hay carefully and render a decision based upon a consideration of all facts relative to the feeding value of the hay, which facts may be used to supplement the definite grading factors. The inspector should note all the grading factors which are not in doubt, also note the facts about aroma and palatability which are not actual grading factors but which have a relation to feed value, and then by weighing these various factors a proper decision usually can be made. The following illustrations show how a consideration and weighing of all evidence may be used in rendering an equitable decision with regard to "liner" lots of hay under conditions where the inspector is in doubt as to the absolute grade.

- (a) Two carlots of timothy hay are thought to be near the grade line between the No. 1 and No. 2 grades according to the color specifications and the inspector is unable to decide positively which of the two grades is correct. One of the cars, however, is free, or nearly free, from foreign material whereas the other car is seen to have an apparent foreign material content of daisies well up to the 10 per cent maximum permitted in the No. 1 grade. From a feeding value or net value standpoint the carlot that is free from foreign material is of somewhat better quality than the other carlot and the purity factor may be used to "weight" the doubtful factor of color and to decide for the No. 1 grade. Vice versa the other car may be graded No. 2 by "weighting" the doubtful factor of color with the known factor of an apparent though tolerated maximum percentage of foreign material..

- (b) Similarly such extraneous factors as early cutting vs. dough stage cutting; exceptional aroma and sweetness vs. lack of distinct aroma; fineness and leafiness of prairie hay vs. distinct stems and the presence of some seed heads; may be employed to make equitable decisions for lots of hay where the inspector is in doubt as to the absolute grade by either the color or foreign material specifications, or both.
- (c) Two carlots of alfalfa are thought to be near the grade line between the No. 1 and No. 2 grades according to the color specifications and the inspector is in doubt as to the absolutely correct grade by the color factor. If the doubtful "per cent green color" is accompanied by an excess "per cent leafiness" over 40 per cent specification for the No. 1 grade, or by clinging foliage, or high purity, or distinct sweet aroma, or any combination of these factors, the equitable grade on a feed value basis for the hay that is a "liner" on color is the No. 1 grade.

On the other hand if the doubtful "percent green color" is accompanied by a doubtful 40 per cent of leafiness, a partially shattered condition of leafiness, maximum content of pigeon grass or stubble, stems approaching coarse texture or scattering seed pods, the equitable grade on a feed value basis is the No. 2 grade.

Other illustrations could be given with reference to this problem of "liners" in hay inspection. The principles of solving this problem are given in the three illustrations above. Fortunately there are not many genuine "liners" among the lots of hay to be inspected but there are occasions when no inspector can be positive of his judgment on the color, leafiness or foreign material percentages of a lot of hay. When in doubt, therefore, the thing to do is to "weight" the doubtful factor with one or more factors that have a genuine relationship to market and feed value.

CHAPTER 27 - SPECIAL GRADES

135 APPLICATION OF SPECIAL GRADES:- Certain superior or inferior characters of hay that are not revealed by the numerical grades and Sample grade are described and emphasized in the standards by the use of special grades (Pages 12, 14, 17, 18, 25, 30, 33 and 36, Handbook of Standards). The application of these special grades and illustrations of their use are discussed on page 42, Handbook of Standards.

136 SEQUENCE OF SPECIAL GRADES:- Whenever more than one special grade is used in the same grade designation they shall follow the order given in the grade specifications, namely, leafiness, color, texture, except when the special grades for Extra Leafy and Green are used in the same grade designation color shall precede leafiness.

Examples:

U. S. No. 1 Extra Leafy Extra Green Alfalfa
U. S. No. 2 Green Coarse Alfalfa
U. S. No. 1 Extra Green Fine Johnson
U. S. No. 2 Leafy Green Alfalfa
U. S. No. 2 Green Extra Leafy Alfalfa
U. S. No. 2 Green Stemmy Clover

CHAPTER 28 - PRESCRIBED REMARKS IN CERTIFICATES

137 Inspectors must write certain prescribed statements in the space provided for "Remarks" in certificates in the following cases:

- (a) Whenever hay of the Groups II, III, and VIII is graded into the No. 3 grade because of stain (HIM 127).
- (b) Whenever hay in Group I is graded No. 2 because a majority of the alfalfa stalks bear brown and/or black seed pods (HIM 157).
- (c) Whenever hay of the class Upland Prairie in Group III is graded lower on account of seed heads and/or jointed stems than on the factor of color (HIM 165).
- (d) Whenever hay is graded Sample grade for any reason (HIM 102).

Prescribed remarks for the four cases given above must be written in the space provided for "Remarks" on the right hand side of the certificate and opposite the grade designation to which they apply.

The following examples show how prescribed remarks should appear in the certificate:

Class and grade	Remarks
U. S. No. 3 Timothy	Stained
U. S. No. 2 Alfalfa	Seed pods
U. S. No. 2 Upland Prairie	Coarse and stemmy
U. S. Sample grade Clover	Garlic odor
U. S. Sample grade Leafy Alfalfa	Heating
U. S. Sample grade Alfalfa	Hot
U. S. Sample grade Alfalfa	Musty and moldy
U. S. Sample grade Timothy	Badly stained

CHAPTER 29 - OPTIONAL REMARKS IN CERTIFICATES

138 A list of optional subjects on which inspectors may write explanatory statements under the provisions of this chapter is given herewith. Detailed instructions for writing explanatory statements on each of these subjects are shown in the numbered cross reference paragraphs for each subject in the list. In this list of subjects certain important problems in Federal hay inspection are shown which often justify explanatory statements in certificates. No other explanatory statements should be employed until the inspector has submitted the problem to his supervisor for consideration and approval.

	Item
BLOOM, in alfalfa hay.....	156
CLOVER, kind of.....	144
CRUSHED HAY.....	160
FOREIGN MATERIAL, kind and character of.....	116-123
FROSTED ALFALFA.....	153
GRAIN HAY TOLERANCES, when considered as grasses.....	124
GRASSES, kind and character of in classes other than Grass Hay.....	130
INJURIOUS FOREIGN MATERIAL, kind of.....	123
LEAVES SHATTERED, in alfalfa.....	148
MOWBURNT HAY.....	129
OVERRIPE, in connection with No. 3 grade only.....	125
SEED HEADS RIPE, in Johnson Hay.....	171
STEMS OF ALFALFA, character of.....	155
SWEATED HAY, description of.....	128
TOBACCO-BROWN ALFALFA.....	152
TANGLED RYE STRAW.....	182½
WEATHERED, in connection with No. 3 grade only.....	126

These explanatory statements about various factors that are often of value to the hay trade but which do not affect the grade may be placed in the certificate under "Remarks" at the request of the applicant, or at the discretion of the inspector (Page 44 Handbook of Standards). Occasionally inspectors are requested to place certain statements in the certificate by the buyer or seller of hay to show that such hay meets some special requirement that is stated in the contract. Inspectors are authorized to certify to such facts if they can be determined and are not of a derogatory nature and not inconisistent with other instructions given in this manual. Inspectors are advised, however, to keep these statements to a minimum because the grade and class usually describe the hay sufficiently and extra statements are unnecessary.

Whenever explanatory statements are to be written for lots of hay which consist of two or more classes or grades, the statement or statements must be written in the space provided for "Remarks" on the right hand side of the certificate and opposite the grade designation to which they pertain, in the following manner:

Class and grade	Remarks
60% U. S. No. 2 Timothy Light Grass Mixed	Grass is quack grass
40% U. S. No. 3 Timothy	Overripe

If a prescribed and optional remark are both to apply to a lot of hay the prescribed remark is written first and the optional remark follows in parenthesis in the following manner:

Class and grade	Remark
U. S. No. 3 Green Alfalfa	Foreign material (woody sweet clover)

SECTION IV - TIMOTHY AND CLOVER HAY
CHAPTER 30 - COLOR SPECIFICATIONS

139 TIMOTHY COLOR:- The green color requirements for the several grades of timothy are given in the Handbook of Official Standards. These percentage requirements mean that the hay shall have the required percent of "natural green color" in the sample unaffected or undamaged by dew, rain, sun bleaching, or by the brown colors in hay arising from maturity and late cutting. The percentage requirements do not mean a percentage of brilliant green, nor any particular shade of green, but rather the percentage of green color natural to timothy in any climatic or soil environment; in other words, the percent of any shade of green that is natural to the hay and which has not been injured by sun bleaching, rain, dew, maturity or other damage. The discolorations that appear commonly in timothy hay and which affect the "percent green color" are either grey-green, yellow, brown, or reddish-brown. The grey-green colors in timothy are due usually to slight sweating or fermentation in stacks or bales and occasionally to growth in humid climates or to having been stored for a long time. The yellow color is due usually to sun bleaching and the brown and reddish-brown colors are due usually to weather damage or overripeness.

140 CLOVER COLOR:- The green color requirements for the several grades of clover are given in the Handbook of Official Standards. These percentage requirements mean that the hay shall have the required percent of "natural green color" in the sample, unaffected or undamaged by sun bleaching, dew, rain, or by the brown colors in clover arising from maturity. The percentage requirements do not mean a percentage of brilliant green, nor any particular shade of green, but rather the percentage of green color natural to the several species of clover, in any climatic or soil environment; in other words, the percent of any shade of green that is natural to clover and which has not been injured by rain, sun, dew, maturity or other damage. The discolorations that appear most commonly in clover hay and which affect the "percent green color" are grey-green sometimes seen in alsike and the various shades of brown common to all clovers. The grey-green colors in alsike and white clover are due usually either to slight sweating or fermentation in stacks or bales or to the bleaching caused by sun and dew while the hay is in the swath, or to having been stored for a long time. The various shades of brown are due usually to varying degrees of weather damage and overripeness. Moderately strong sweating also will produce a light brown or molasses color in clover.

The definite color specifications for the various grades of clover hay may be translated into color terms and conceptions of color commonly employed in the hay trade. It must be understood, however, that these translated terms and percentages are approximate and not specific, and are given here as rough guides to the grades by color. The best method for inspectors to follow in maintaining their accuracy in applying the color specifications is to send in samples for accurate color measurement and then to grade according to the type samples.

U. S. EXTRA GREEN CLOVER

Nearly uniform natural green color with some red or pink color in heads.

U. S. NO. 1 CLOVER

Green to greenish brown with some brown heads tolerated.

U. S. NO. 2 CLOVER

Greenish brown to brown.

U. S. NO. 3 CLOVER

Clover having smaller amounts of green color than those specified for the No. 2 grade will fall into the No. 3 grade on the grading factor of color. Typical No. 3 Clover is nearly all dark brown from weathering or overripeness.

141 COLOR OF TIMOTHY AND CLOVER MIXTURES:- The color specifications for all timothy and clover mixtures are expressed with a single percent green requirement. In most cases Timothy Light Clover Mixed and Timothy Medium Clover Mixed may be graded according to the same color standards and types as are used for Timothy. In both of these classes the mass color of the timothy and clover is usually of equal grade and the timothy usually predominates both in quantity and in physical appearance. The class Clover Light Timothy Mixed should be graded according to the color standards and types for the class Clover as clover usually predominates in quantity and in physical appearance. When there is a conflict in the color of the two kinds of hay, the hay should be graded on the basis of the mass color and general appearance.

CHAPTER 31 - DESCRIPTION OF TYPICAL NO 1 AND NO. 2 TIMOTHY

142 Most inspectors find that fixing the dividing line between No. 1 and No. 2 Timothy is the most difficult problem in the inspection of timothy hay. Usually No. 3 Timothy is easy to grade because of its apparent lack of green color, its overripeness, or its distinctly weathered condition. Similarly a good, bright No. 1 Timothy having 50 percent or more green color is an outstanding and easily recognized type or grade of hay. But a decision as between a top No. 2 or a low No. 1 Timothy is often difficult. To assist inspectors in this problem a word picture of typical No. 1 Timothy is here given which summarizes briefly a number of other items in this manual on color, time of cutting, maturity, etc.

Typical No. 1 Timothy hay is hay that was cut not later than full bloom. If the inspection reveals any material quantity of ripe or late dough stage seeds the hay usually does not have sufficient color for the No. 1 grade. Brightness of color is essential to the No. 1 grade as an indication of good curing with no more than light weather damage. Distinctly faded colors due to weathering usually accompany a percent of color less than 45. If the hay was cut early and is bright in

appearance the No. 1 grade tolerates either a moderate amount of the bright yellow sun bleach on heads and stems that is caused by over-drying in the swath or by dews followed by strong sunlight, or brown blades on the lower part of the stems.

On the other hand, if the hay is strongly sun bleached and dew damaged, or if 2/3 to 3/4 of the leaves are distinctly brown, the hay is no better than a No. 2 in grade. The No. 1 Timothy grade has been formulated so as to include early cut hay, but if early cut, to tolerate a moderate amount of bleach or dew discolorations, and the brown leaves on the lower part of the stems caused by scalding or maturity. The special grade "Extra Green" is to be used for the fancier types of No. 1 Timothy.

Inspectors are requested to give thought also to Item 87 of this manual in connection with this problem.

CHAPTER 32 - UNUSUAL PROBLEMS IN GRADING TIMOTHY AND CLOVER HAY

143 **STEMMY CLOVER:-** Red clover, sometimes called medium red clover, and mammoth clover, sometimes called mammoth red clover, are very similar in appearance. In fact they are so much alike that even from a botanical standpoint it is almost impossible to identify one from the other. Mammoth clover usually blooms about two weeks later than red clover and on good soil it usually grows ranker and has coarser and pithier stems than red clover. Clover which is stemmy and coarse is of relatively low feed value because of the lack of leaves and the waste in feeding, due to the fact that stock will not eat all of the coarse stems.

The special grade "Stemmy hay" in Group II has been devised primarily for the purpose of grading this stemmy and coarse textured mammoth clover but the grade covers red clover also that comes under the stemmy grade specifications. Mammoth clover that is not stemmy is graded the same as red clover that is not stemmy and inspectors should not attempt to identify or describe mammoth clover except on the basis of its stemmy character.

The requirement for the special grade "Stemmy clover hay" is that the leaves and blossoms of the clover shall constitute less than 20 percent of the total weight of the clover. Clover hay of this grade is distinctly lacking in leaves and blossoms. The special grade of "Stemmy hay" is used only in two classes, namely, Clover, and Clover Light Timothy Mixed. In either of these two classes if the clover portion of the mixture is stemmy, according to the specifications for "Stemmy hay" on page 15, Handbook of Standards, the special grade "Stemmy" should be used with the numerical grade or Sample grade.

144 **KIND OF CLOVER:-** It is of value to the hay trade at times to have the kind of clover, whether red, alsike or white, stated in the certificate, as well as to give the grade and class. Buyers of timothy and clover mixed hay, especially for race horse use, show preferences for one or the other kinds of clover. Inspectors are authorized to certify to such facts (HIM 138) by means of optional statements under "Remarks", written as follows:

Class and grade

Remarks

U. S. No. 2 Timothy Medium Clover Mixed

Clover is alsike

145 SEDGES AND RUSHES IN TIMOTHY AND CLOVER HAY:- The inclusion of sedges and rushes in the definition for "Grasses" in the Timothy and Clover Hay group is done for the practical purpose of allowing small amounts of these plants to pass as grasses in the various specifications providing they have recognized feed value and are not coarse in texture. Rushes, such as Juncus, and various small sedges sometimes take possession of small wet spots in old timothy meadows and thus become mixed with timothy and such cultivated grasses as bluegrass and redtop in the various hay classes of this group. Thus, under normal conditions of timothy hay production, a minor portion of the grass mixture may consist of these rushes and sedges. As the definition for "Grasses" is written the entire grass portion of those hay classes where grass is specified may consist of sedges and rushes, but, as a matter of fact, little or no timothy hay is produced in which all or nearly all of the grass portion consists of sedges and rushes. Unusual quantities of sedges and rushes in timothy hay may be described in certificates by means of explanatory statements (HIM 130 and 138).

SECTION V - ALFALFA AND ALFALFA MIXED HAY

CHAPTER 33 - LEAFINESS SPECIFICATIONS

146 IMPORTANCE OF LEAFINESS:- The leafiness of alfalfa is the most important grading factor in the class Alfalfa, as well as in all those classes containing light mixtures of other kinds of hay with alfalfa, because the leaves contain approximately 70 percent of the crude protein of the plant. The sale value of the hay is affected by the amount of leaves that are present and the amount of leaves that are clinging to the stems. Premium prices are paid in most markets by dairymen for the leafy alfalfa while the very stemmy types are discounted quite heavily. Leafiness, as a grading factor for alfalfa, is to be considered of more importance than color or foreign material.

147 EVIDENCES OF LEAFINESS PERCENTAGE:- In United States standards for alfalfa, the percentage of leafiness is computed from the total quantity of alfalfa in the sample and not from the total quantity of all the various kinds of hay. The specifications of 50 percent of leaves for the Extra Leafy grade, 40 percent for the No. 1 grade and 25 percent for the No. 2 grade are based upon actual analyses made upon hundreds of bales of alfalfa obtained from all the large alfalfa producing States. Before a final decision was made with regard to these percentages, bales with various known percentage amounts of leaves were studied to determine the physical appearance of alfalfa hay having various percentages of leaves. The appearance of alfalfa as to leafiness is described in succeeding paragraphs:

EXTRA LEAFY HAY having 50 percent or more of leaves with most of the leaves clinging, has a dominant, leafy appearance that almost hides the stems, and is found most often in alfalfa cut at the bud or pre-bud stage.

NO. 1:- Hay with 40 percent or more leaves has a leafy appearance but has many more stems visible than is the case with the Extra Leafy Hay. In this type at least 1/2 of the total leaves usually are clinging to the upper part of the stems. Practically all alfalfa will have 40 percent of leaves if cut not later than half bloom and if properly cured, handled and baled without overdrying. Hay with coarse stems or nearly coarse stems is not usually fully 40 percent leafy by weight.

NO. 2 GRADE:- Hay with 25 percent leaves has a distinctly stemmy appearance because of the loss of leaves due to overripeness, overdrying, weather damage, or careless handling and baling.

There are three distinct cleavage lines apparent in alfalfa as to the degree of leafiness. One of these lines is between 20 and 25 percent leafiness, or between apparent steminess and a medium degree of leafiness. Another line is between 35 and 40 percent leafiness, or between the medium leafy and the leafy degree; and a third line at about 50 percent leafiness, or between the leafy and the extra leafy degree. A degree of leafiness greater than 50 percent is generally characterized by the distinct character of clinging foliage, and even at 40 percent at least 1/2 of the leaves usually cling to the upper part of the stems. Fully shattered leaves rarely constitute 40 percent of the weight of the bale.

Certain correlations between leafiness and other factors also have been noted. Where seed pods are present in the alfalfa the leafiness is liable to be low because the lower leaves of the plants are shed as the plants mature in the field. Where the stems of alfalfa have a faded and weak green color and are spotted with rust discolorations, additional evidence is provided of late cutting and matured plants, and such hay, therefore, is apt to be lacking in leafiness. Insufficient leafiness for the No. 1 grade is often found also in the rank growth of Hairy Peruvian alfalfa on rich irrigated or sub-irrigated land where the lower leaves "damp off" prior to cutting or are easily shattered if the hay was over-dried in the field. When the stems are coarse, or nearly so, a 40 percent degree of leafiness is very doubtful unless the leaves are almost entirely clinging. A high degree of leafiness usually correlates with a fine and medium sized stems.

In all cases where the outside areas of the bales show a lack of leaves the inspector should cut into the bale with a strong, sharp knife or break a bale in order to determine the leafiness on the inside. Leafiness is so important as a grading factor in alfalfa that the inspector should never jump at conclusions but always check the grade by using the various methods given above.

148 SHATTERED LEAVES:- Alfalfa bales are found sometimes in which the leaves have been broken from the stems and are in a distinctly shattered condition. When this condition is found it is usually due to several causes, either the alfalfa was overripe before it was cut, dried too long in the swath prior to raking, or was baled when very dry. If due to the first two causes mentioned the bales are usually deficient in leafiness because of the leaves lost prior to baling as well as thereafter. and the hay would not grade better than a No. 2 in any event. If due to the last cause the bales might have sufficient leaves by weight for the No. 1 grade although some of the leaves are shattered. In most instances, however, hay which has 60 percent or more green color, and in which the leaves are distinctly shattered, will grade as U. S. No. 2 Green Alfalfa rather than U. S. No. 1 Alfalfa.

Inspectors are cautioned not to grade alfalfa as U. S. No. 1, U. S. No. 2 Leafy, or U. S. No. 3 Leafy, unless at least 13/ of the total foliage is clinging to the upper part of the stalks. It is unusual for alfalfa to have 40 percent or more of leafiness by weight when the leaves are shattered in major degree. Whenever the shattered condition of alfalfa leaves is such as to cause a doubt with respect to a sufficient percentage of leaves for the No. 1 grade the hay should be graded as U. S. No. 2 Green Alfalfa rather than U. S. No. 1. Inspectors are cautioned also not to use the explanatory statement "Shattered leaves" in connection with the No. 1 grade. Optional statements under "Remarks" about shattered leaves in connection with the No. 2 or No. 3 grades are written in certificates (HIM 138) as follows:

Class and grade	Remarks
U. S. No. 2 Alfalfa	Shattered leaves

Shattered leaves should not be considered as foreign material except in those occasional instances where the bales have been pressed from the "Clean-up material" around a hay press and thus consist of chaff, dirt, and badly broken stems and leaves.

149 APPLICATION OF THE LEAFINESS SPECIFICATIONS IN ALFALFA MIXED HAY:- Leafiness is a grading factor in the following classes of alfalfa mixed hay - Alfalfa Light Grass Mixed, Alfalfa Light Timothy Mixed, Alfalfa Clover Mixed, Alfalfa Light Johnson Mixed, and Alfalfa Light Grain Mixed, and is interpreted and used in these classes in the same manner as in the class Alfalfa. In cases where the percentage of the kind of hay other than alfalfa approaches the maximum limit it may be rather difficult to use the alfalfa leafiness as a grading factor because the other kind of hay interferes with the appraisal of the degree of leafiness, but in most cases the mixture does not interfere seriously with the examination of the alfalfa portion for leafiness. Technically, and according to the specifications in the standards, inspectors are not required to employ leafiness as a grading factor in the classes Alfalfa Heavy Grass Mixed, Alfalfa Heavy Timothy Mixed, Alfalfa Heavy Johnson Mixed, and Alfalfa Heavy Grain Mixed, although the leafiness factor in these classes may be used on certain occasions to settle the grade on "liners" according to methods shown in HIM 134.

CHAPTER 34 - COLOR SPECIFICATIONS FOR ALFALFA

150 The term "percent green color" employed in these standards represents the amount of natural green color in field cured hay computed as a percentage of the 100 percent green color of hay produced so as to have received no discoloration from maturity, sun bleach, dew, rain, or other damage. Green color in alfalfa does not mean necessarily a strong, brilliant green, but rather the green color natural to alfalfa produced and cured under favorable conditions. The discolorations that appear commonly in alfalfa hay and which affect the "percent green color" are either grey-green, yellow, brown, or reddish-brown. The grey-green colors in alfalfa are due usually to slight sweating or fermentation in stacks, mows, or bales, and occasionally to the fading of the natural green color from overripeness or from a long period of storage. The yellow color is due usually to sun bleaching. Brown and reddish-brown colors are due usually to rain damage or strong fermentation.

CHAPTER 35 - UNUSUAL PROBLEMS IN GRADING ALFALFA AND ALFALFA MIXED HAY

151 COARSE ALFALFA is produced either on old meadows where the alfalfa grew very large because of the thin stand or on meadows where the alfalfa was allowed to become mature or overripe before it was cut. ALFALFA STEMS MUST BE ROUND AND HARD as well as to be of large diameter in order to be considered "coarse" in United States standards. This round, hard condition should apply to the greater part of the stem although the upper part of the stem may be flattened. Hairy Peruvian alfalfa that is grown extensively in the Southwest is a variety that grows rank and coarse and the stems are often of large diameter. Such hay should not be graded under the special grade for coarse alfalfa unless the stems are hard and round as well as of coarse texture. In the diameter specifications for "Coarse Hay" in Group I, the term "equal to and greater than the diameter of No. 11 steel wire" means that some of the stems must have diameters greater than a No. 11 steel wire.

152 TOBACCO-BROWN ALFALFA:- This term is used in some markets to describe alfalfa that has fermented or sweated (HIM 128) so extensively in the stack or mow that the

hay has lost all of its green or yellow-green color and is very brown or reddish-brown in color. This product is rare rather than common and is produced only when temperature and moisture conditions in the stack or mow are favorable for a degree of fermentation which is more than slight (producing grey-green color) but not sufficient to actually char the hay. So-called tobacco-brown alfalfa may be recognized by its reddish-brown color that is nearly uniform throughout the lot, by its strong fermented or ensilage odor, and by the pressed appearance of the leaves.

This type of alfalfa should not be confused by the inspector with the stack or windrow weathered hay that is faded and brown and which usually grades No. 3 on account of color or leafiness, or both, or which may even be of such low quality as to grade Sample grade. No tobacco-brown hay that is sound but which is devoid of any green color should be graded into Sample grade because of such lack of green color, because this fermented or ensilaged hay has a high protein content and when sound is palatable.

Much of the tobacco-brown alfalfa that is sound has a degree of leafiness sufficient for the No. 1 grade and should be graded, therefore, in most instances, as "U. S. No. 3 Leafy Alfalfa". In unusual instances it may be entitled to the grade "U. S. No. 3 Extra Leafy Alfalfa".

The inspector is warned that many carlots (probably the majority) of so-called tobacco-brown alfalfa contains numerous bales that are unsound or partly unsound because of mold or must. The center of stacks or mows of this strongly fermented alfalfa is often brown, badly burned or moldy, and unless the baling crew is extremely careful to pitch aside this unsound hay many slugs of it are baled with the brown hay that is sound. No inspector should ever issue a straight certificate on a carlot of this so-called tobacco-brown hay until he has broken several suspicious looking bales in order to determine whether there is any unsound hay present. When bales of unsound tobacco-brown hay are discovered along with other bales of sound hay of this type the number of bales of sound and unsound hay should be counted or estimated as accurately as possible and the number or percentage of each kind shown in the certificate as follows:

Class and grade	Remarks
75% U. S. No. 3 Leafy Alfalfa	
25% U. S. Sample grade Leafy Alfalfa	Moldy

The instructions and grade designations above given in this item will be sufficient to grade most lots of so-called tobacco-brown alfalfa. Inspectors may write the optional statement "tobacco-brown" under "Remarks" in the certificate (HIM 138) as follows:

Class and grade	Remarks
U. S. No. 3 Leafy Alfalfa	Tobacco-brown

Under no circumstances, however, should this last described statement be employed if the inspector is in doubt as to whether the hay is brown from fermentation or from weathering.

153 FROSTED ALFALFA:- Alfalfa that has been frosted or badly frosted is either a very dark green or a faded yellow in color and usually has a shriveled or blistered appearance. Some dealers and feeders believe that frosted alfalfa is harmful to livestock but there is no definite proof of this allegation. Inspectors should not consider frosted alfalfa as hay of distinctly low quality unless it is badly frosted or badly weathered. Frosted alfalfa is usually leafy because it is often cut at a pre-bud stage. It usually grades U. S. No. 1 or No. 2 Extra Leafy Alfalfa, or U. S. No. 1 Alfalfa, or U. S. No. 2 Leafy Alfalfa, unless it is undercured in which case it would grade U. S. Sample grade Extra Leafy Alfalfa or U. S. Sample grade Leafy Alfalfa. The optional statement "Frosted" under "Remarks" may be written in the certificate (HIM 138) as follows:

Class and grade	Remarks
U. S. No. 2 Extra Leafy Alfalfa	Frosted

154 BADLY FROSTED ALFALFA usually is alfalfa that contained excessive moisture and was frozen during continued low temperatures. It is usually a faded yellow color. Such hay must be graded Sample grade and the remark "Badly frosted" given as the reason for that grade (HIM 137).

Class and grade	Remarks
U. S. Sample grade Alfalfa	Badly frosted

155 STEMS OF ALFALFA:- The condition of alfalfa stems, whether pliable, hard, fine, or short is of considerable importance in the sale of alfalfa in some important hay markets. Pliable stems are preferred often by dairy feeders. Fine, short stems are greatly preferred by rabbit feeders. Stem character is not of sufficient importance, however, to warrant its use as a definite grading factor. When inspectors are requested to certify facts about stem quality or when they consider marketing practices necessitate it (HIM 138) they may write optional statements under "Remarks" in certificates as follows:

Class and grade	Remarks
U. S. No. 2 Leafy Alfalfa	Pliable stems
U. S. No. 2 Green Alfalfa	Hard, brittle stems.
U. S. No. 1 Alfalfa	Pliable stems
U. S. No. 1 Extra Leafy Alfalfa	Fine, short stems.

As a general rule inspectors are instructed to refrain from writing statements about hard stems in connection with the U. S. No. 1 grade, in order to avoid derogatory statements in connection with that grade. If the alfalfa has leafiness enough for the No. 1 grade, it is best to use the straight numerical grade only in most instances.

156 ALFALFA BLOSSOMS AND IMMATURE SEED PODS:- Occasional lots of alfalfa are found in which many of the alfalfa stalks show large quantities of alfalfa blossoms and small immature green seed pods (HIM 157). Dairy men in certain areas discriminate against such hay and include in their hay contracts a clause which prevents the delivery of this type of hay. Inspectors may certify as to the blossoms and immature seed pods in the alfalfa hay in the following manner (HIM 138).

U. S. No. 1 Alfalfa

Full bloom

157 ALFALFA HAVING MANY SEED PODS:- The standards for Alfalfa and Alfalfa Mixed Hay contain the following specifications: "Hay in which a majority of the alfalfa stalks bear brown and/or black seed pods shall not be graded No. 1 nor be assigned any special grade except Coarse." For the purposes of this specification the words "brown and/or black seed pods" shall be interpreted to include all pods that are tinged with brown.

It is not often necessary to make use of this specification in the grading of alfalfa but occasional lots of hay are seen where the seed pod condition must be given consideration. When a majority of the stalks bear brown and/or black seed pods, the poddiness and the degree of maturity must be considered in order to decide whether such hay shall be graded No. 2, No. 3, or Sample grade.

Brown and/or black seed pods in alfalfa, when in quantity, indicate a matured or nearly matured condition (HIM 90), and a high degree of crude fiber in the stems as compared to the stems of alfalfa cut in early bloom. Pods may be observed that range in maturity from green, unfilled pods to dark brown pods filled with numerous plump, mature seeds. In the midsummer months drought, lack of irrigation water, or excessively hot summer weather will hasten the development of many seed pods and to save the crop the hay is cut often in this condition where a majority of the stalks bear quantities of immature pods. In some cases farmers plan to raise an alfalfa seed crop and after the pods have formed it is found that the seed has failed to set in quantity and the crop is then cut for hay. Such hay usually has a distinct majority of the stalks bearing brown and/or black, nearly matured pods containing a few ripe seeds and numerous half formed seeds. In other and more rare cases alfalfa is cut for hay that has aged in the field to a point where the pods are dark brown in color and numerous seeds are ripe and plump.

In most instances poddy alfalfa is deficient in color and/or leafiness for the No. 1 grade, or if the age is well advanced, the hay will not meet the color and/or leafiness requirements of the No. 2 grade. Exceptions are found, however, to this common correlation between poddiness and the grading factors of leafiness and color. The paragraphs next succeeding will assist inspectors in grading and certificating alfalfa that is distinctly poddy.

In those unusual cases where a lot of hay will meet the leafiness, color and foreign material requirements of the No. 1 grade for any class in Group I but has a majority of the alfalfa stalks bearing brown and/or black seed pods, the hay cannot be graded No. 1 nor be assigned any of the special grades Extra Leafy, Extra Green, Leafy or Green. The special grade "Coarse" may be assigned, however, to supplement the No. 2 grade in case the stalks are coarse according to the grade specifications for coarse hay. Where the hay has large quantities of black fully mature pods and seeds, the hay is "badly overripe" and must be graded Sample grade because "badly overripe" is a definite specification for Sample grade irrespective of leafiness and color. Very rarely indeed would a lot of alfalfa have the leafiness and color quality of No. 1 and the badly overripe condition of Sample grade. In practically all cases hay that would have the leaf and color quality of No. 1 would bear brown

seed pods only and such hay should be graded as U. S. No. 2 Alfalfa followed by the statement "Seed pods" under "Remarks" (HIM 137) rather than Sample grade.

The use of a lower grade on account of seed pods than the grade which would otherwise apply, is authorized only for those cases where the hay is No. 1 according to leafiness, color and foreign material. Hay, for example, that is No. 2 because of leafiness, color or foreign material must not be graded down to No. 3 on account of seed pods.

In cases where hay of any class in Group I grades No. 3 on account of one or more of the factors of leafiness, color and foreign material, and where the hay is also "overripe" because of many brown and nearly mature seed pods, the explanatory statement "Overripe" may be written on the certificate (HIM 125 and 138) beneath the grade designation. Hay to be called "overripe" must have a majority of the alfalfa stalks bearing seed pods and many of the pods must be brown and contain some half formed seeds, with perhaps a few ripe seeds, as evidence of the overripeness. The explanatory statement "Overripe" shall be used only in conjunction with No. 3 grade and must not be used in conjunction with No. 2 hay.

In all cases where hay of any class in Group I has a majority of the alfalfa stalks bearing fully matured seed pods, as evidenced by black pods and numerous plump seeds, the hay should be graded Sample grade- Badly overripe (HIM 111, 125 and 137). The Sample grade specification "badly overripe" shall apply always as a cause for Sample grade irrespective of any other grading factors.

Statements under "Remarks" with reference to alfalfa having many seed pods are written as follows:

Class and grade	Remarks
U. S. No. 2 Alfalfa	Seed pods
U. S. No. 3 Alfalfa	Overripe
U. S. Sample grade Alfalfa	Badly overripe

159 MATURITY OF GRAIN HAY IN THE ALFALFA GRAIN MIXED CLASSES:- The maturity of the grain is not used as a grading factor in the classes Alfalfa Light Grain Mixed and Alfalfa Heavy Grain Mixed. Alfalfa usually predominates in the mixtures that fall into these two classes since the minimum amount of alfalfa present must be 40 percent. Inspectors, however, may use to advantage the maturity of the grain portion of these mixtures in determining the grade of those lots of hay that are of a "liner" character according to the official grading factors. In other words, if the grain hay was early cut it would give a plus value to the lot of hay as a whole, and if late cut a minus value (HIM 134).

160 CRUSHED HAY:- Recently a machine has been developed which crushes the stems of alfalfa by passing them between rollers just after being cut to hasten the curing process. The crushed appearance of the stems is very noticeable and many of them are dark green due to the process. An optional statement (HIM 138) with reference to crushed hay may be written in the space provided for "Remarks" as follows:

Class and grade	Remarks
U. S. No. 1 Alfalfa	Crushed stems

SECTION VI - PRAIRIE HAY

CHAPTER 36 - U. S. STANDARDS INCLUDE PRINCIPAL COMMERCIAL KINDS

161 The hay trade's conception of prairie hay is that it consists principally of the bluestems, wheatgrasses, and slough grass, that grow in practically a pure stand on the virgin meadows of the Prairie and Great Plains States. These grasses ordinarily do not develop seed heads prior to cutting and therefore the hay does not have many distinct stems like timothy.

CHAPTER 37 - METHODS FOR IDENTIFYING THE CLASSES UPLAND PRAIRIE AND MIDLAND PRAIRIE

162 A special section on the identification of the various grasses found in the Upland Prairie and Midland Prairie classes is given in items 213 to 223 of this manual. The information given hereafter is of a general character and applies to the several classes of prairie hay rather than to the species of grasses.

163 COMPARISON OF CHARACTERISTIC UPLAND GRASSES, MIDLAND GRASSES AND WHEATGRASS:- There are a number of characteristic differences between these three kinds of prairie hay that the inspector should learn to recognize in order that he may be able to classify prairie hay properly. UPLAND PRAIRIE hay usually has a dull, green color and sometimes a purplish hue due to the presence of bluestems, a fragrant hay odor, a great many short leaves with few distinct stems, and is relatively soft to the sense of touch. It contains usually such distinct kinds of foreign material as blazing star, asters, goldenrod, wax myrtle, wild sunflowers, daisies, or other plants which will thrive only on the well drained upland soils. WHEATGRASS has several distinct characteristics which can be used to distinguish it from other upland grasses. It has a dull, greyish-green color, many short stems with short, rolled blades attached in branch-like manner, and occasional wheatlike heads. It is commonly very pure as to other grasses and the foreign material, if any, is usually rosin weed.

MIDLAND PRAIRIE hay usually has a smooth appearance, a shiny bright green color, a ground or marsh odor, and long stringy leaves. It is relatively harsh to the touch, tough when twisted, and comparatively free from foreign material. Such foreign material as it does contain consists of coarse sedges and rushes, wild iris, perennial smartweed, and cat-tails. Nearly all hay from midland prairie meadows contains some Spartina grass, or triangular stemmed sedges that present evidence to the inspector of moist meadow conditions. See items 223 and 209 for descriptions of Spartina and sedges.

CHAPTER 38 - COLOR SPECIFICATIONS FOR PRAIRIE HAY

164 In the standards for prairie hay the term "percent green" has the same meaning that it has in the alfalfa standards. The discolorations that appear in prairie hay,

however, which effect "percent green color", are distinctly different from those in alfalfa. The brown or reddish-brown colors in prairie hay are due usually to maturity, but sometimes to weather damage, sun bleach, or warehouse bleach. The purple color on some kinds of prairie grasses, especially bluestem, is the natural color of the grass. Grey-green color is the natural color of some kinds of prairie grasses, especially the wheat-grasses.

CHAPTER 39 - UPLAND PRAIRIE TEXTURE

165 The standards provide that hay in the class Upland Prairie in which $\frac{1}{3}$ or more of the upland grass stalks bear seed heads and/or jointed stems shall be graded one grade lower than the grade determined from the color factor. Under this requirement upland prairie hay, for example, which is 50 percent green and does not contain over 10 percent foreign material but which has many upland grass stalks with seed heads and/or jointed stems, would be graded No. 2. This type of hay is discounted usually in the market. Lowering the grade because of seed heads and/or jointed stems should cause the grade to correlate usually with the market value.

For all upland prairie hay graded down on account seed heads and/or jointed stems a prescribed statement (HIM 137) with reference to this condition shall be made in the certificate under "Remarks" as follows:

Class and grade	Remarks
U. S. No. 2 Upland Prairie	Seed heads and/or jointed stems

CHAPTER 40 - EXPLANATION OF THE CLASS MIDLAND PRAIRIE

166 There are three distinct grasses that are defined as midland grasses in the standards. Whenever hay consists of over 40 percent of these grasses, either singly or in combination, the hay is classed as Midland Prairie and the remainder may be upland grasses, or any other grasses, sedges and rushes that are defined in the Standards.

CHAPTER 41 - SEDGES AND RUSHES IN PRAIRIE HAY STANDARDS

167 The sedges and rushes in upland and midland prairie meadows are commonly found in the swales or moist areas where the water level is close to the surface, and in hay production they are often raked up and mixed in with the true midland grasses or with bluestem and other upland grasses in upland meadows. For these reasons the definition for "grasses" includes the sedges and rushes, and the definition for "upland grasses" includes a 10 percent tolerance of midland grasses and/or other grasses. Thus, according to these definitions, the classes Upland Prairie, and Upland-Midland Prairie Mixed, may contain 10 percent of sedges and rushes, considered as "other grasses". Prairie hay which contains more than 10 percent of sedges and/or rushes cannot be classified as Upland Prairie, or Upland-Midland Prairie Mixed but must be classed either as Mixed Hay, Midland Prairie or Grass Hay, as the case might be.

The class "Midland Prairie" may consist very largely of sedges and rushes in a mixture which contains more than 40 percent of the true Midland grasses (usually *Spartina*) as listed and defined in the standards, providing it is known that the sedges and rushes have recognized feeding value and further providing that they are not coarse and woody.

Inspectors are cautioned that when a lot of hay is pure or nearly pure rushes and/or sedges of recognized feed value with no apparent mixture of cultivated or wild grasses, such hay should be graded under United States standards for Grass Hay. Local experience in the feeding of certain kinds of wild hay is often essential in making a decision as to whether certain kinds of sedges and rushes should be graded under United States standards or whether the hay is fit only for packing, bedding or rug making (HIM 188).

SECTION VII
JOHNSON AND JOHNSON MIXED HAY

CHAPTER 42 - IDENTIFICATION OF JOHNSON HAY,
CANE AND BARNYARD GRASS HAY

168 In order to prevent errors in identification, essential information of a general character is given here with regard to the physical appearance of Johnson hay, cane and barnyard grass hay (HIM 193). JOHNSON GRASS leaves have midribs similar to corn leaves and when cured the leaves always fold along this midrib. The leaves usually show some of the red or purplish spots due to the so-called sorghum disease. Johnson grass also has an open, spreading head or panicle. CANE hay can be distinguished from Johnson hay by the large broad leaves by the sweet taste of the pith caused by the high sugar content in cane, and generally by the large compact head or panicle. BARNYARD GRASS hay can be distinguished from Johnson hay by the shorter leaves which do not fold along the midrib. The stems of barnyard grass tend to be angular when cured, and the grass never has the red spots due to the so-called sorghum blight.

CHAPTER 43 - COLOR SPECIFICATIONS FOR JOHNSON HAY

169 In the standards for Johnson hay the term "percent green" has the same meaning that it has in the alfalfa and prairie hay standards. The green color requirements for the various grades are not the same, however, because under normal conditions Johnson hay does not have as much green color as other kinds of hay. A yellowish-green color is natural to Johnson grass that is not characteristic of timothy, prairie grasses or alfalfa. The discolorations that appear commonly in Johnson hay and which affect the percent green color are either grey-green, yellow, brown, or red. Grey-green colors in Johnson hay are commonly caused by bale sweating in hay baled from windrows or cocks in the field. Yellow colors, similar in appearance to bright straw color, are common in properly cured Johnson hay. The Johnson grass plants turn slightly yellow in the field just before heading and much bleaching takes place in the field because of the length of time necessary to cure Johnson hay.

Thus the inspector must realize that the color specifications for Johnson hay are based on the inclusion of more yellow color in the No. 1 and No. 2 grades than in case of other kinds of hay. U. S. No. 2 Johnson hay, for example, may be about 4/5 bright yellow with only a trace of natural green and still meet the color requirements of 25 percent green for the No. 2 grade. The brown colors are due usually to weather damage, and the reddish colors are due either to frost or the so-called sorghum blight or disease. The red spotted condition is more severe and common in the late fall on the last cutting of Johnson grass than in the summer cuttings.

CHAPTER 44 - "COARSE" OR "RIPE" JOHNSON GRASS

170 The special grade "Coarse" in the Johnson and Johnson Mixed classes applies to all classes and grades. This special grade represents a low quality hay which is discriminated against in the markets. It is produced from Johnson grass which is allowed to pass far beyond the proper time of cutting (HIM 92) or from a meadow with a very thin stand. In either case the stems have become coarse and the hay is of

relatively low feed value and palatability. When this kind of hay is fed to livestock a large percentage of waste always occurs. In the diameter specifications for "coarse hay" in Group IV, the term "more than 30 percent of stalks having diameters equal to and greater than the diameter of No. 9 steel wire" means that some of the stems must have diameters greater than a No. 9 wire.

171 JOHNSON GRASS STALKS BEARING RIPE SEED:- The seed of Johnson grass is considered ripe when the seed hulls have turned red or purplish-red in color. In fact, any seed heads which show red color should be considered mature. Sometimes the seed heads have matured so far that the seeds are shelled out and no evidence of maturity remains except the bare panicles. When Johnson hay contains ripe seed heads the optional statement, "Ripe seed heads" may be written if desired, under "Remarks" in certificates (HIM 138). Explanatory statements with respect to ripe seed heads are written in certificates as follows:

Class and grade	Remarks
U. S. No. 2 Johnson	Ripe seed heads

SECTION VIII - GRASS HAY

CHAPTER 45 - EXPLANATION OF GRASS HAY

172 Grass Hay includes hay made from the cultivated grasses such as redtop, blue-grass, Bermuda grass, quack grass and cheat, or from those miscellaneous wild grasses, sedges, and rushes of known feed value but not commonly known as prairie hay. Grass hays are not produced in sufficient quantity to justify separate classifications so they are all placed in one group. They are distinctly different from the prairie grasses which are found growing in the Prairie and Great Plains States and which are recognized as "Prairie Hay" in commerce.

The important point to keep in mind in the determination of Grass Hay is that it must consist of over 60 percent of grasses other than timothy, Johnson grass, upland and midland prairie grasses, grain cut for hay, millet and Sudan grass. Whenever more than 60 percent of the bale consists of grasses it is considered as Grass Hay and the remainder of the bale may consist of timothy, clover, alfalfa, or any other kind of hay.

Several grasses that are not included in the standards for Grass Hay are Tabosa grass (*Hilaria mutica*), galleta grass (*Hilaria jamesii* and *Hilaria rigida*), grapevine mesquite (*Panicum obtusum*), and salt or alkali grass (*Distichlis stricta*). These grasses usually grown under arid climatic conditions and may be fairly good pasturage but if allowed to grow large enough to be cut for hay they usually become woody and of low value.

173 SEDGES AND RUSHES of recognized feed value are also graded as Grass Hay because they resemble the grasses to a certain extent and are of not sufficient importance to justify separate classification. There may be some confusion as to whether hay consisting largely of sedges and rushes should be graded as Midland Prairie or Grass Hay. Sedges and rushes must always be graded as Grass Hay unless more than 40 percent of the hay consists of one or more of the three midland grasses specifically named in the standards.

There are several important hay regions in which grass hay is produced that consists largely of sedges and rushes. Much wild hay from the South Park and Gunnison districts in Colorado and some hay from the Elkhorn Valley of Nebraska consists largely of sedges and rushes. The Colorado South Park hay is produced in a high mountain valley where the meadows are flooded or sub-irrigated. The hay consists largely of the rush *Juncus balticus* with small amounts of other grasses and sedges. The hay from Gunnison, Colorado, consists of various mixtures of sedges with triangular stems, spike rushes, and a flat bladed grass (*Beckmannia syzigachne*). Some of the Nebraska Elkhorn Valley grass hay consists of three-cornered sedges mixed with redtop and small quantities (less than 40 percent) of upland or midland grasses.

Other kinds of sedges and rushes than those described above are cut for hay sometimes in other regions of the United States. Inspectors should exercise great care in classifying nondescript types of sedges and rushes as Grass Hay, without first having submitted samples to the Washington office for identification and class-

ification. The long, stringy, wiry sedges grown in the marshes of Michigan, Wisconsin, and Minnesota are not considered Grass Hay under these standards. While sedges of this character are fed sometimes in communities where hay of better quality is not available, they are not recognized generally as feeding types of hay for commercial purposes.

CHAPTER 46 - COLOR SPECIFICATIONS OF GRASS HAY

174 In the standards for Grass Hay the term "percent green" has the same meaning that it has in the timothy and prairie hay standards. The green color requirements for the various grades are the same as for prairie hay. The discolorations that are common in prairie hay are usually the ones that are found in grass hay.

CHAPTER 47 - GRADE DESIGNATIONS FOR GRASS HAY

175 There are so many kinds of grass hay throughout the United States that it is necessary to add information in the certificate about the grasses of which the hay is composed. This information about the grasses must be made a part of the grade designation and can be either the common names of the grasses, written in the order of importance, or a local trade name that is well known among dealers and that is descriptive of the character of the hay.

The common names are used when the hay consists of distinct species of well known grasses that are easily recognized by the inspector. Local trade names may be employed for miscellaneous assortments of grasses, no one of which is of great importance, or in any instance, where the trade name has become the common name among dealers and feeders.

Examples of Grass Hay designations:

U. S. No. 2 Grass Hay, Redtop and Bluegrass.

U. S. No. 1 Grass Hay, Colorado South Park.

U. S. No. 1 Grass Hay, Elkhorn Valley.

U. S. No. 1 Grass Hay, Bermuda Grass.

U. S. No. 2 Grass Hay, Cultivated Cheat.

SECTION IX - MIXED HAY

CHAPTER 48 - EXPLANATION OF MIXED HAY

176 This group is a catch-all for mixtures of hay that are not as common or as regularly quoted as those combinations of hay which are classified in the United States standards for Alfalfa and Alfalfa Mixed Hay; Timothy and Clover Hay; Prairie Hay; Johnson and Johnson Mixed Hay; Grain, Wild Oat, Vetch, and Grain Mixed Hay; Lespedeza and Lespedeza Mixed Hay; Soybean and Soybean Mixed Hay; or Grass Hay. Hay mixtures that come under the provisions of the group "Mixed Hay" must contain, either singly or in combination, 50 percent or more of timothy, clover, alfalfa, upland and midland grasses, Johnson grass, grain hay, wild oat hay, vetch hay, lespedeza, soybean hay, and/or other grasses as defined in the United States standards for hay. The 50 percent requirement, as employed in this definition for Mixed Hay, is an arbitrary percentage, chosen for the purpose of confining the group to those miscellaneous hay mixtures in which at least one-half of the hay consists of hays for which United States standards have been devised. This 50 percent rule, therefore, excludes hays which consist of over 50 percent of such forage plants as peanuts, cowpeas, or some other kind of hay for which there are no United States standards.

Examples of hay mixtures that are Mixed Hay:

- (1) 50% timothy, 25% clover, 25% alfalfa
- (2) 40% timothy, 30% clover, 30% bluegrass
- (3) 50% upland prairie, 20% redtop, 20% clover,
10% midland prairie.

Examples of hay mixtures which cannot be included in Mixed Hay:

- (1) 60% cowpea hay, 40% Johnson
- (2) 80% cane hay, 20% Johnson.

177 **GRADE BASED ON PREDOMINANT KIND:-** The grade of Mixed Hay is based upon the grade requirements and definitions for that kind of hay which predominates in the mixture, except that all numerical and special grade specifications pertaining to leafiness, stemminess, coarseness, and fineness shall be disregarded. If no one kind of hay predominates, the grade is based upon the color and foreign material specifications for the several kinds of hay which have similar grade requirements and which predominate when taken together. The grade specifications for the minor part or parts of the mixture are disregarded in determining the grade.

In determining the grade by color the mass color of the total hay is considered rather than the color of the predominant kind. For example, the grade according to color of a lot of Mixed Hay consisting of 70 percent timothy, 15 percent clover, and 15 percent grass would be determined from the color specifications for the class Timothy, which color specifications are applied to the mass color of the entire lot of hay.

178 MIXTURE PERCENTAGES PART OF GRADE DESIGNATION:- In writing a grade designation for Mixed Hay the approximate percentage of each kind of hay which constitutes more than 10% of the mixture must be written in the order of percentage importance. The approximate percentages are a part of the grade designation and should never be included in parenthesis. If foreign material is very noticeable in the hay, a statement about it should be included in the grade designation. When the percentage of foreign material is stated it should be placed last in the grade designation. Where it is practical to do so it is advisable to have the sum of the various percentages total 100, although the grades for Mixed Hay do not specifically require it.

Whenever Mixed Hay contains grain hay of any kind in excess of ten percent, the kind of grain hay with the approximate percentage should be specifically mentioned in the grade designations.

When the grasses in Mixed Hay consist of one or two grasses that can be readily identified, the common names of such grass or grasses, with the approximate percentage, shall be used in the grade designation. In all other cases where grasses constitute more than ten percent of the total mixture the term "grasses" should be used.

Examples of Mixed Hay grade designations:

U. S. No. 1 Mixed Hay, Approximately 40 percent Timothy, 35 percent Clover, and 25 percent Redtop.

U. S. No. 3 Mixed Hay, Approximately 40 percent Timothy, 35 percent Redtop and Quack grass, and 25 percent Clover.

U. S. No. 3 Green Mixed Hay, Approximately 55 percent Alfalfa, 15 percent Timothy, 15 percent Grasses, and 15 percent Foreign Material.

U. S. No. 2 Mixed Hay, Approximately 50 percent Alfalfa, 30 percent Oat Hay, and 20 percent Grasses.

SECTION X - STRAW

CHAPTER 49 - EXPLANATION OF STRAW

179 Standards for straw cover only the straw from the common grain crops wheat, oats, barley, rye, and rice, and does not include the residue of other crops from which the seed has been threshed. These standards, therefore, cannot be used for the straw of such crops as timothy, reedtop, beans, soybeans, and flax, which must be certificated according to instructions given in item HIM 190.

Straw as defined in the standards may include not more than 10 percent of grasses. This 10 percent allowance of grasses is intended to provide for those mixtures of straw and grasses that are produced occasionally on land which was in sod the previous year or that are the result of the freezing out of a grain crop in the low spots of a field.

CHAPTER 50 - COLOR SPECIFICATIONS FOR STRAW

180 The color grade requirements for straw are expressed in general terms; bright for No. 1, and weathered or stained for No. 2; instead of in percent green as in the hay standards. Studies in measuring color by the method used for hay were made but because of the variation in color of the different kinds of straw the results were unsatisfactory. The descriptive term "bright" refers to the natural color of that particular kind of straw and does not permit the straw to be discolored to any extent by rain, dew, or other damage. The term "weathered" or "strained" refers to the color that arises when straw receives moderate weather damage which causes the brown discolorations known as "weathered" or the dirty yellowish discolorations known as "stained". The terms "badly stained" and "badly weathered" are specifications for Sample grade and apply to the more severe degrees of damage.

CHAPTER 51 - CHAFF

181 Chaff is defined, in the straw standards, as being the shattered glumes of the grain, also all pieces of straw not over four inches in length. These fine pieces of straw are similar to chaff and therefore considered as such in the standards. The quantity of chaff in the straw is a grading factor in the numerical grades, in Sample grade, and in the special grades for "chaffy" straw. The numerical grades will permit 35 percent of chaff in both the No. 1 and No. 2 grades. The special grades for chaffy straw are provided for straw which contains more than 35 percent chaff, and are applicable to both the numerical grades and Sample grade. Straw which contains more than 75 percent chaff is graded Sample grade Chaffy.

182 METHODS OF DETERMINING THE AMOUNT OF CHAFF:-- The chaffiness of straw can be determined by taking a slug from a bale of straw and shaking it apart with a fork. After the straw has been thoroughly loosened the chaff and short pieces of straw can be separated by taking small forkfulls and shaking the chaff out. The long straw can then be placed in a separate pile and when all the long straw has been separated with the fork the few pieces of straw over four inches in length that are left with the chaff can be picked out by hand and added to the long straw. The weight of each is then determined and the percentage calculated.

182½ TANGLED RYE STRAW:- Special grades have been included in the Straw Standards for straight rye straw and long rye straw. These special grades are to be used for all rye straw which have been threshed and baled so as to preserve the straw in a long and untangled condition. When rye has been threshed by the regular threshing method and the straw is broken and tangled from threshing the optional statement tangled rye straw may be written if desired under "Remarks" in certificates (HIM 138) explanatory statements with respect to tangled rye straw are written in certificates as follows.

Class and grade	Remarks
U. S. No. 2 Rye Straw	Tangled Rye Straw

SECTION XI - GRADING FORAGE PRODUCTS
NOT CLASSIFIED IN U. S. HAY STANDARDS

CHAPTER 52 - GRADING OR DESCRIBING HAY NOT
INCLUDED IN U. S. STANDARDS

183 There are a number of kinds of hay such as cane hay, sweetclover hay, and peanut hay, that are not defined and classified in the United States standards. Such kinds of forage are hay in the common language of the trade but specifications for them have not been prepared and therefore they are not included in the United States Hay Standards effective April 1, 1936. Federal inspectors, however, may certificate facts about these unclassified kinds of hay by methods other than those provided by the United States hay standards. For all hay products not defined in the United States standards, the class, quality, and condition of the product may be certified to in Federal hay certificates by means of other recognized grades or by means of descriptive terms.

184 USING OTHER GRADES:- When the hay is such that it does not come under any of the present United States standards, inspectors may certify the grade of hay by other recognized grades which they can interpret properly. When grades or specifications other than United States standards are used a statement naming the specifications used must be written in the certificate beneath the grade designation.

185 DESCRIBING HAY:- Whenever grades are not used but the hay described instead, a statement should be made in the Federal certificate, in the space provided under "Grade and class", of the approximate percentages of the different kinds of hay, and of such facts as the inspector is willing to make about the color, texture, leafiness, and condition as will properly describe the hay. On the line beneath the descriptive matter the statement "Not classified in U. S. hay standards", should be written. The different kinds of hays and their approximate percentages should be listed in the order of their importance. When foreign material is present in amounts that are very noticeable, the name of the kind (type) of foreign material and its approximate percentage should be listed last.

The following examples illustrate methods for describing hay in lieu of grading it:

Peanut Hay, brown and stemmy.

Not classified in U. S. hay standards.

Sweetclover Hay, green, fine stemmed and leafy.

Not classified in U. S. hay standards.

186 CANE HAY:- Cane is grown in some regions as an annual hay crop and some of it is baled and placed on the market. Cane hay may be recognized by the large, broad leaves and reddish-brown color. The head is usually a rather compact panicle with black or red seeds. This kind of hay is rather difficult to cure and even when well cured it is apt to become sour in the spring of the year when the weather becomes warm. For these reasons, inspectors are warned to be very careful in inspecting cane hay and to always look for unsoundness. Inspectors may certify to the quality and condition of cane hay by describing it in certificates according to instructions in item HIM 185.

The following examples illustrate methods for describing cane hay:

Cane hay, greenish-yellow color and free from weeds.
Not classified in U. S. hay standards.

A mixture of approximately 80% cane hay, 10% Johnson grass
and 10% weeds. Hay is of a yellowish-brown color.
Not classified in U. S. hay standards.

187 CHOPPED ALFALFA cannot be graded under the standards for Alfalfa and Alfalfa Mixed Hay but may be described in the certificate in the space provided under "Grade and class" according to the instructions given in item HIM 185.

Examples:

Chopped Alfalfa, bright green, leafy and pure.
Not classified in U. S. hay standards.

Chopped Alfalfa, yellowish-brown in color, stemmy and mature.
Not classified in U. S. hay standards.

Chopped Alfalfa, heating and musty.
Not classified in U. S. hay standards.

188 PACKING HAY is a trade term commonly applied to hay which consists of grasses, sedges and rushes that are harsh and relatively unsuitable for feeding purposes but that are useful for various kinds of packing. This type of hay is produced principally in the marshes of Minnesota, Wisconsin, and Michigan, and there is a considerable market demand for it for use in packing crockery, bricks, etc. However, it is sometimes cut in the immature stage and used for feeding. For this reason it is better to issue a certificate describing the hay according to instructions given in item HIM 185 than to designate it as Packing hay.

Examples:

Sedge hay, fine, long and of good green color.
Not classified in U. S. hay standards.

Sedge hay, coarse, stringy and of poor color.
Not classified in U. S. hay standards.

189 HAY CONTAINING MORE THAN 35 PERCENT FOREIGN MATERIAL cannot be graded under any of the United States standards but may be described in the certificate according to instructions given in item HIM 185. The name of the kind (type) of foreign material as weeds, stubble, etc. should be used in the description rather than the words "foreign material".

Example:

A mixture of approximately 55 percent clover and 45 percent weeds. The clover has color good enough for U. S. No. 2.
Not classified in U. S. hay standards.

CHAPTER 53 - GRADING PRODUCTS SIMILAR TO HAY

190 Such products as threshed timothy, threshed alfalfa, threshed redtop, flax straw, bean straw, rank lowland grasses, and other material of a similar nature cannot be certified to as "hay" by Federal inspectors. Inspectors are authorized, however, to certify such products as "not hay" and to describe them. In all such cases the words "not hay" must appear in the certificate following the description of the product.

Example:

Threshed Timothy

Not hay

CHAPTER 54 - BEDDING HAY

191 Certain classes and grades of hay in the United States standards are considered suitable for so-called bedding hay by the U. S. Army, such as U. S. No. 3 Upland Prairie, U. S. No. 3 Midland Prairie, U. S. No. 3 Grass Hay, therefore, it is unnecessary to specify that it is suitable for bedding because the U. S. Army will only accept certain classes and grades of hay for bedding.

SECTION XII
DESCRIPTION OF CERTAIN GRASSES, LEGUMES AND WEEDS

192 Inspectors must be competent to identify many plants named in the United States standards in order to determine certain hay classes, or to correctly estimate mixtures and foreign material. In succeeding items a number of grasses, legumes and weeds are described to assist inspectors, but the descriptions do not include many hay plants and weeds that are very common and easily recognized. The terms used in these descriptions do not conform to botanical nomenclature because the descriptions have been written for the layman who does not usually understand botanical terms.

CHAPTER 55 - GRASSES FOUND IN CULTIVATED MEADOWS

193 BARNYARD OR WATER GRASS (*Echinochloa crusgalli*):- A smooth grass two to four feet tall. Panicle (flowering head) composed of a number of branches which are covered with awned spikelets that are crowded on one side. The leaves are flat, broad and short and the stems, when dry, have a ridged and angular appearance.

194 BERMUDA GRASS (*Cynodon dactylon*):- Usually less than a foot high. Flowers are borne on very slender spikes $\frac{1}{2}$ to 2 inches long. The flowers or seeds appear to be grouped on one side of the spike. Three to six spikes in a finger-like cluster.

195 BLUEGRASS, CANADA (*Poa compressa*):- Has flat stems and contracted panicles (flowering heads), spreading in form but more compact than Kentucky bluegrass. Spikelets 3 to 9 flowered. Leaves mostly basal which means that most of the leaves are at the base of the plant and very few on the stems. Color, bluish green.

196 BLUEGRASS, KENTUCKY (*Poa pratensis*):- Has round stems and spreading panicles (flowering heads) similar in appearance to spreading oats. Spikelets 3 to 5 flowered. Leaves mostly basal, which means that most of the leaves are at the base of the plant and very few on the stems.

197 BROMEGRASS, AWNLESS (*Bromus inermis*):- Has stems about the same size as timothy. Sheaths and leaves are smooth. Large spreading panicle (flowering head). Branches of panicle arising in clusters from central stem. Spikelets on ends of the branches. Spikelets many flowered and seldom awned.

198 BROMEGRASS, WILD (*Bromus* spp.):- Are usually hairy on the stems, leaves and heads. They have flat leaf blades and spreading panicles (flowering heads). These panicles are usually drooping. Spikelets few to many flowered and each flower usually bearing an awn. Plants become purple or purplish-brown at maturity.

199 BROOM SEDGE (*Andropogon virginicus*):- The stems are branched in the upper part. Racemes (flower clusters) scattered along upper part of branches. These clusters are white and very feathery.

200 CHEAT OR CHESS, CULTIVATED (*Bromus secalinus*):- A smooth grass 1 to 3 feet tall with flat leaf blades and open, drooping panicle (flowering head). Spikes are club shaped and spikelets have very short awns. Plants become yellow or yellowish-brown at maturity.

201 CRABGRASSES (*Digitaria* spp.):— Have flat leaves. Flowers are borne in finger-like spikes arranged at or near the end of the stems. These spikes vary from 3 to 10 in number and are 2 to 6 inches long. Flowers or seeds are on both sides of the spike.

202 ORCHARD GRASS (*Dactylis Glomerata*):— Has stems a little larger than timothy. It has long, broad, flat leaves. Panicle (flowering head) has a few stiff branches with the dense flower clusters at the ends of the branches. Spikelets are 3 to 5 flowers.

203 PIGEON GRASS (*Setaria* spp.):— Has smooth stems and margins of leaves hairy. The panicle is spike-like, cylindrical and bears long, soft hairs. Spikelets 1 flowered. Seeds come out free of chaff.

204 QUACK GRASS (*Agropyron repens*):— Has stems about the same size as timothy. The stems are very smooth and usually have a shiny green color. Flowering head is a spike with spikelets arranged alternately on the stem as in wheat heads, spikelets 3 to 7 flowered. The broad side of the spikelets turns toward the main stem.

205 REDTOP (*Agrostis palustris*):— Is a larger plant than either of the blue-grasses. Panicle (flowering head) large, open and spreading, usually having reddish or purplish color; branches of panicle arising in clusters from central stem. Spikelets one flowered.

206 WILD OATS (*Avena* spp.):— Resembles cultivated oats but can be distinguished by its longer panicles (flowering heads), a smaller size seed, hairiness at the base of seed, and long twisted awn. Seeds usually have a slanting horse shoe shaped scar at the base.

CHAPTER 56 - GRASSES FOUND IN BOTH CULTIVATED AND UNCULTIVATED MEADOWS

207 CHEAT, WILD (*Bromus* spp.):— Wild cheat is another common name for wild bromegrasses (HIM 198).

208 PASPALUM (*Paspalum* spp.):— Heads have one to many spike-like racemes (flower clusters). Flattened, oblong seeds borne in two rows on one side of the racemes. Spikelets one flowered.

209 RUSHES or JUNCUS:— Are grass-like plants. Stems are usually round, smooth and seldom have leaves. Leaves when present are not attached to joints as in timothy.

210 SEDGES:— Are grass-like or rush-like plants. Stems slender and solid and usually triangular in form. Leaves usually long with closed triangular sheaths and are arranged in 3 ranks.

211 WILD RYE (*Elymus* spp.):— Is a tall grass with dense terminal spikes (flowering heads). The seeds and scales about the seeds are usually awned, giving the head the appearance of being covered with bristles. Sometimes these awns may be so stiff that the grass may be considered injurious foreign material because of the harsh beards.

212 WIRE GRASSES (*Aristida* spp.):— Have very narrow leaves which are often rolled giving them a stringy appearance. This grass can be recognized also by the triple awned seed which is sometimes found in the hay. Wire grasses are very fibrous and difficult to break when twisted.

CHAPTER 57 — GRASSES FOUND IN UPLAND PRAIRIE MEADOWS

213 BLUESTEMS (*Andropogon* spp.):— The stems and sheaths of all the bluestems have a bluish or purple color and the stems are branched. Leaves are flat.

BLUESTEM, BIG (*Andropogon furcatus*):— Racemes (flower clusters) borne in twos and fours at the ENDS of the branches only. Small, distinct beards on seed heads.

BLUESTEM, LITTLE (*Andropogon scoparius*):— Racemes (flower clusters) scattered along upper part of the branches. Matured heads covered with fuzz.

BEARDGRASS, WHITE (*Andropogon saccharoides*):— Has bearded nodes (joints). Racemes (flower clusters) in a compact group of 6 to 10 at the ends of the branches. The club shaped head is covered with fine, white hairs.

214 GRAMA, BLUE (*Bouteloua gracilis*):— Flower stalk has 2 or 3 spikes each about one inch long. One spike is at the end of the stem and the others a short distance below. Spikelets appear to be on one side only.

215 GRAMA, SIDE-OATS (*Bouteloua curtipendula*):— Has many short spikes turning downward along a common axis forming a long one-sided flower cluster.

216 INDIAN GRASS (*Sorghastrum nutans*):— Has bronze COLORED panicles (flowering heads), 4 to 12 inches long. Leaf blades are distinctly constricted at the base where they join the sheaths.

217 PRAIRIE JUNE GRASS (*Koeleria cristata*):— Has a densely flowered spike-like panicle (flowering head). It always appears golden yellow (ripe) in the bale. Only the stems and heads are present in hay.

218 STIPA (*Stipa* spp.):— Grasses have very narrow leaves which are often rolled giving them a stringy appearance. It is practically impossible to differentiate between the leaves of wire grasses and those of Stipa. Stipa grass is sometimes called needle grass because the seed has a bent awn that is spiral at the base and the lower end of the seed has a very sharp point which may be injurious to stock. Stipa grasses will break when twisted much easier than wire grasses.

219 WHEATGRASSES (*Agropyron* spp.):— Are pale green in color and the leaves are usually rolled inward from the edges when dry giving the hay a stringy appearance. The rolled leaves are comparatively short.

WHEATGRASS, SLENDER (*Agropyron paniculatum*):— Flowering head is a very slender spike. Spikelets 3 to 5 flowered and usually far apart on the rachis (stem).

WHEATGRASS, WESTERN or BLUESTEM (*Agropyron smithii*):- Leaves are 4 to 8 inches long. Flowering head is a spike very similar to quack grass with spikelets arranged alternately as in a wheat head. Spikelets 6 to 12 flowered.

CHAPTER 58 - GRASSES FOUND IN BOTH UPLAND PRAIRIE AND MIDLAND PRAIRIE MEADOWS

220 SWITCH GRASS (*Panicum virgatum*):- Has a large spreading panicle with spikelets one flowered. It usually appears in the bale as a broad leafed grass with rather heavy stems. There is a tuft of hairs at the place where the leaf blades and sheath are joined.

CHAPTER 59 - GRASSES FOUND IN MIDLAND PRAIRIE MEADOWS

221 BLUEJOINT (*Calamagrostis* spp.):- Sheaths shorter than internodes, leaves flat. Open, brown or pale purple panicle (flowering head). Spikelets 1 flowered. Stems distinct and most species have blue color at the stem joints.

222 SPRANGLE TOP (*Fluminea festucacea*):- Is a tall plant with distinct smooth stems. Sheaths often overlapping. Panicle (flowering head) large and open. Spikelets 3 to 4 flowered. Leaves flat.

223 SLOUGH GRASS (*Spartina pectinata*):- Leaf blades one foot or more in length and rough on the margins. Leaves curl inward and resemble long cords when the grass is cured. Stems are usually very short and obscured by the overlapping sheaths. There is a fringe of hairs at the place where the leaf blade and sheath are jointed.

CHAPTER 60 - GRASSES AND SEDGES THAT ARE NOT CONSIDERED HAY UNDER UNITED STATES STANDARDS

224 GALLETA GRASS (*Hilaria jamesii* and *H. rigida*):- Wiry stemmed grasses with slightly rough leaves and leaf sheaths. Stems are branched like bluestems. When found in hay usually about 18 inches long. Heads seldom present but a few bare axes can usually be found in the hay.

225 GRAPEVINE MESQUITE (*Panicum obtusum*):- A wiry stemmed grass with narrow panicles. Spikelets are single seeded. Seeds are flat on one side and convex on the other.

226 SALT OR ALKALI GRASS (*Distichlis stricta*):- A wiry grass with rather rigid leaves and densely flowered spikelets. Usually has 10 to 12 flowers in each spikelet.

227 TABOSA GRASS (*Hilaria mutica*):- A wire stemmed grass similar to galleta grass.

228 TUSsock SEDGE (*Carex stricta*):- A sedge with very long leaves (18 to 24 inches long) which are rough on the margins, flowering heads seldom if ever found in the hay. (See Sedges, HIM 209).

CHAPTER 61 - LEGUMES

229 CLOVER, ALSIKE (*Trifolium hybridum*):- Stems are glabrous (smooth) or nearly so. Flowering heads occur on ends of branches. Flowers pink or pinkish and smaller in size than red clover. Alsike clover has the leaves attached by means of stipules which cause a constriction on the stem.

230 CLOVER, BURR (*Medicago hispida*):- The cured stems of burr clover closely resemble the stems of red clover although smaller in size. Burr clover has a sweet pungent odor quite similar to sweet clover. Burr clover is best identified by its seed pods which are spiral shaped and have several seeds in each pod. Seed pods are about $\frac{1}{4}$ inch in diameter with 1 or 2 rows of curved prickles on the edges. Seed pods usually borne singly or in pairs on seed stalks.

231 CLOVER, JUNE OR MEDIUM RED AND MAMMOTH OR MAMMOTH RED (*Trifolium pratense*):- Stems are more or less pubescent or hairy and are slightly constricted where the leaves are attached. Flowering head in axil of leaves. Flowers red. Stems hollow and slightly pithy.

232 LESPEDEZA (*Lespedeza* spp.):- Has three leaflets to each leaf. The cured stems are of fine texture, brown in color and have a somewhat woody texture. It is a small plant seldom if ever more than 18 inches high.

233 YELLOW TREFOIL OR BLACK MEDIC (*Medicago lupulina*):- Stems much branched. Flowers yellow and much smaller than those of alfalfa which is a kindred plant. Seed pods small and in dense groups at ends of small branches, kidney shaped, rough edged and black.

CHAPTER 62 - WEEDS FOUND IN CULTIVATED AND UNCULTIVATED MEADOWS

234 BLAZING STAR (*Laciniaria pynostachya*):- Is 2 to 5 feet tall; spikes arranged along central axis forming very dense flowering head. Flowers purple giving the entire flowering head a purplish cast. Stems coarse, rough and without leaves, very woody, much branched.

235 BUCKHORN OR NARROW LEAVED PLANTAIN (*Plantago lanceolata*):- Is often mistaken in the bale for clover. Flowering stalks slender and channeled along the length of the stem; no nodes (stem joints); spike (head) short and very dense; seeds amber colored and boat shaped. Buckhorn, when in hay, always has a dark brown color.

236 CONE FLOWERS (*Rudbeckia* spp.):- Rough stalked plants with large cone shaped heads. The heads are usually black in color.

237 DAISY, FLEABANE OR WHITE TOP (*Erigeron annuus*):- Is often mistaken in the bale for clover. It may be distinguished from clover by the different leaf attachment. A small knot is left on the stem where the daisy leaf is broken off. Daisy stems are much harder and pithier than clover stems. If flower heads are present, they may be identified by the yellow centers and white petals.

238 BLUE INDIGO (*Baptisia bracteata*):- A woody, bushy, branched plant that is covered with hairs. Dark or bluish green when dry. Leaves have very short stems and consist of 3 leaflets. Leaflets oblong, $1\frac{1}{2}$ to 3 inches in length and somewhat leathery.

239 ROSIN WEED (*Grindelia squarrosa*):- An erect, branched plant 1 to 2 feet high with yellow, disklike flowers borne at the ends of the branches. The lower parts of the flower and the leaves are covered with a resinous substance. Leaves long and narrow with sawtooth edges. Stems are coarse, rough and woody.

240 WAX MYRTLE (*Myrica cerifera*):- A shrub the leaves of which have a fragrant odor when crushed; golden resinous spots on under surface of leaf. Leaves oblong and leathery.

CHAPTER 63 - GRASSES THAT ARE CONSIDERED AS INJURIOUS FOREIGN MATERIAL

241 BARLEY, WILD (*Hordeum murinum* and *H. pusillum*):- Slender grasses which develop harsh beards at maturity. These grasses are quite similar to squirrel-tail grass (HIM 243) but are smaller in size with shorter heads and beards.

242 BRONCHO GRASS (*Bromus villosus*):- This grass is similar in most respects to the other wild brome grasses mentioned in items 198 and 207 but when mature the seeds have awns (beards) which are more than an inch long and which are hard and rough. Mature broncho grass with long awns is injurious foreign material.

243 SQUIRREL-TAIL GRASS (*Hordeum jubatum*):- A slender, erect grass about 1 to $2\frac{1}{2}$ feet tall. The head resembles cultivated barley except that the seeds are much smaller and the awns (beards) more numerous. These awns become very harsh when mature and will cause injury to livestock when eaten.

SECTION XIII - EXAMPLES OF INSPECTORS' NOTES

244

Form HFS-778

Applicant John Doe
 Identification B 70 80694
 Location Charleston, W. Va.
 Seal off _____ Seal on _____
 Amount Carlot Date 1/15/40
 Part inspected 30 bales in 2 downys
 Class and grade _____
U. S. No. 2 Alfalfa

Leaf 30%
Color 35% - Green 5%
F. M. 5% - Ripe pigweed grass
 Condition _____
 Cert. No. P-3 Inspector C. F. W.
8-5443

Form HFS-778

Applicant John Doe
 Identification N. K. P. 86324
 Location _____
 Seal off _____ Seal on _____
 Amount 10 lbs Date 1/15/40
 Part inspected _____
 Class and grade _____
U. S. Sample grade
Upland Prairie F. M.

Color 40%
F. M. 25%
 Condition _____
 Cert. No. S-25 Inspector C. F. W.
8-5443

Form HFS-778

Applicant John Doe
 Identification Ra trailer B 846
 Location College Park, Md.
 Seal off _____ Seal on _____
 Amount 9 1/2 tons Date 1/16/40
 Part inspected Complete
 Class and grade _____
U. S. No 2 Leafy Alfalfa

Leaf 40%
Color 45%
F. M. 5% Plantain
 Condition _____
 Cert. No. C-90 Inspector C. F. W.
8-5443

Form HFS-778

Applicant John Doe
 Identification Md. truck 80952
 Location Ft. Hayes Md.
 Seal off _____ Seal on _____
 Amount 16150 lbs Date 1/16/40
 Part inspected _____
 Class and grade _____
50% U. S. No. 2 Timothy light
Clover mixed
40% U. S. No. 3 Timothy
10% U. S. No. 2 Timothy

 F. M. _____
 Condition _____
 Cert. No. A-1251 Inspector R. L. S.
8-5443

Form HFS-2061

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

C-

90



Washington, D. C.

ORIGINAL

COMPLETE INSPECTION CERTIFICATE

I CERTIFY that I inspected the following lot of hay and that the class, quality, and condition thereof were as stated:

Located at College Park, Maryland Date inspected January 16, 1940
Quantity 9½ tons Identification Pa. Trailer B-846

GRADE AND CLASS	REMARKS
U. S. No. 2 Alfalfa	

Fees, \$ 1.50 John Doe Applicant. C. F. Welsh Inspector.

Charges, \$ Total, \$

This certificate is issued in compliance with the regulations of the Secretary of Agriculture governing the inspection of hay pursuant to the act making appropriations for the U.S. Department of Agriculture, and is receivable in all courts of the United States as prima facie evidence of the truth of the statements therein contained.
This certificate does not excuse failure to comply with any of the regulatory laws enforced by the United States Department of Agriculture.

U. S. GOVERNMENT PRINTING OFFICE 16-3942

Complete inspection of a truck lot of hay. The inspector was able to see all of the bales on the sides, ends, and top of the load and was of the opinion that the bales examined were representative of the entire lot. The state license number should be included under identification. In case the inspection covers a truck and trailer lot of hay, the state license numbers of both the truck and trailer should be shown.

CORRECTED CERTIFICATE

Form HFS-2061

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

C-

91



Washington, D. C.

ORIGINAL

COMPLETE INSPECTION CERTIFICATE

I CERTIFY that I inspected the following lot of hay and that the class, quality, and condition thereof were as stated:

Located at College Park, Maryland Date inspected January 16, 1940
Quantity 9½ tons Identification Pa. Trailer B-846

GRADE AND CLASS	REMARKS
U. S. No. 2 Leafy Alfalfa	
This certificate is issued in lieu of and therefore supersedes Certificate No. 90.	

Fees, \$ 1.50 John Doe Applicant. C. F. Welsh Inspector.

Charges, \$ Total, \$

This certificate is issued in compliance with the regulations of the Secretary of Agriculture governing the inspection of hay pursuant to the act making appropriations for the U.S. Department of Agriculture, and is receivable in all courts of the United States as prima facie evidence of the truth of the statements therein contained.
This certificate does not excuse failure to comply with any of the regulatory laws enforced by the United States Department of Agriculture.

U. S. GOVERNMENT PRINTING OFFICE 16-3942

(Corrected certificate). Complete inspection of a truck lot of hay. After the inspector had issued certificate No. 90 he discovered that an error had been made in transcribing the notes and that the grade designation included in the certificate was incorrect. When such errors occur in preparing an inspection certificate, the original and carbon copies having been mailed should be recalled and a corrected certificate and copies issued with an explanatory letter.

Form HFS-2063

ORIGINAL



UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
Washington, D. C.

S- 25

SAMPLE INSPECTION CERTIFICATE

I CERTIFY that I inspected the **SAMPLE OF HAY** identified below and that the class, quality, and condition thereof were as stated:

Sample identified as **NKP 86324** Quantity in sample **10 lbs.** Date inspected **1/15/40**

Furnished by **John Doe**

Represented as having been taken from **Car NKP 86324**

GRADE AND CLASS OF SAMPLE	REMARKS
U. S. Sample Grade Upland Prairie	Foreign Material

The grade assigned in this certificate applies only to the sample identified above

Fee, \$ **0.25** **C. F. Welsh**

Inspector.

This certificate is issued in compliance with the regulations of the Secretary of Agriculture governing the inspection of hay pursuant to the act making appropriations for the United States Department of Agriculture, and is receivable in all courts of the United States as prima facie evidence of the truth of the statements therein contained. This certificate does not excuse failure to comply with any of the regulatory laws enforced by the United States Department of Agriculture.

U. S. GOVERNMENT PRINTING OFFICE 16-8578

Sample inspection of approximately 10 pounds of hay taken from a carlot in dispute.

Form HFS-2060

ORIGINAL



UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
Fort Hoyle, Maryland

A- 1251

COMPLETE INSPECTION CERTIFICATE

I CERTIFY that I inspected the following lot of hay and that the class, quality, and condition thereof were as stated:

Located at **Fort Hoyle, Maryland** Date Inspected **January 16, 1940**

Quantity **16,150 lbs.** lbs. Identification **Md. Truck 80-952**

GRADE AND CLASS	REMARKS
50% U. S. No. 2 Timothy Light Clover Mixed	
40% U. S. No. 3 Timothy	
10% U. S. No. 2 Timothy	

John Doe **L. L. Shook,**
Contractor. Lt. Col., V. C. Inspector.

This certificate is issued in compliance with the regulations of the Secretary of Agriculture governing the inspection of hay pursuant to the act making appropriations for the United States Department of Agriculture, and is receivable in all courts of the United States as prima facie evidence of the truth of the statements therein contained. This certificate does not excuse failure to comply with any of the regulatory laws enforced by the United States Department of Agriculture.

U. S. GOVERNMENT PRINTING OFFICE 16-8577

Complete inspection of a truck lot of hay at an Army Post. A special type of complete inspection certificate is used by the licensed officers of the U. S. Army. On this certificate the quantity is given in pounds and a space provided for the contractor's name instead of the applicant. Since no fee or charges are collected these items do not appear on this type of certificate.

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